

Radio Control **CAR ACTION**

THE WORLD'S LEADING R/C CAR MAGAZINE

47380



November 1994

Get Started in R/C
BONUS Buyers' Guide!
23 HOT PRODUCTS

**TIADUM
ASSERS**

Compare
the top four
trucks

etting
the
most
from your

SUSPENSION

**CRASH-TESTED
THIS ISSUE:**

Tamiya Castrol Celica
DFNA Pirate 10
Trinity Revolver SS



point blank™



Don't get ripped off!

**HOW TO BUY A
USED NITRO TRUCK**

USA \$4.50 CANADA \$5.50



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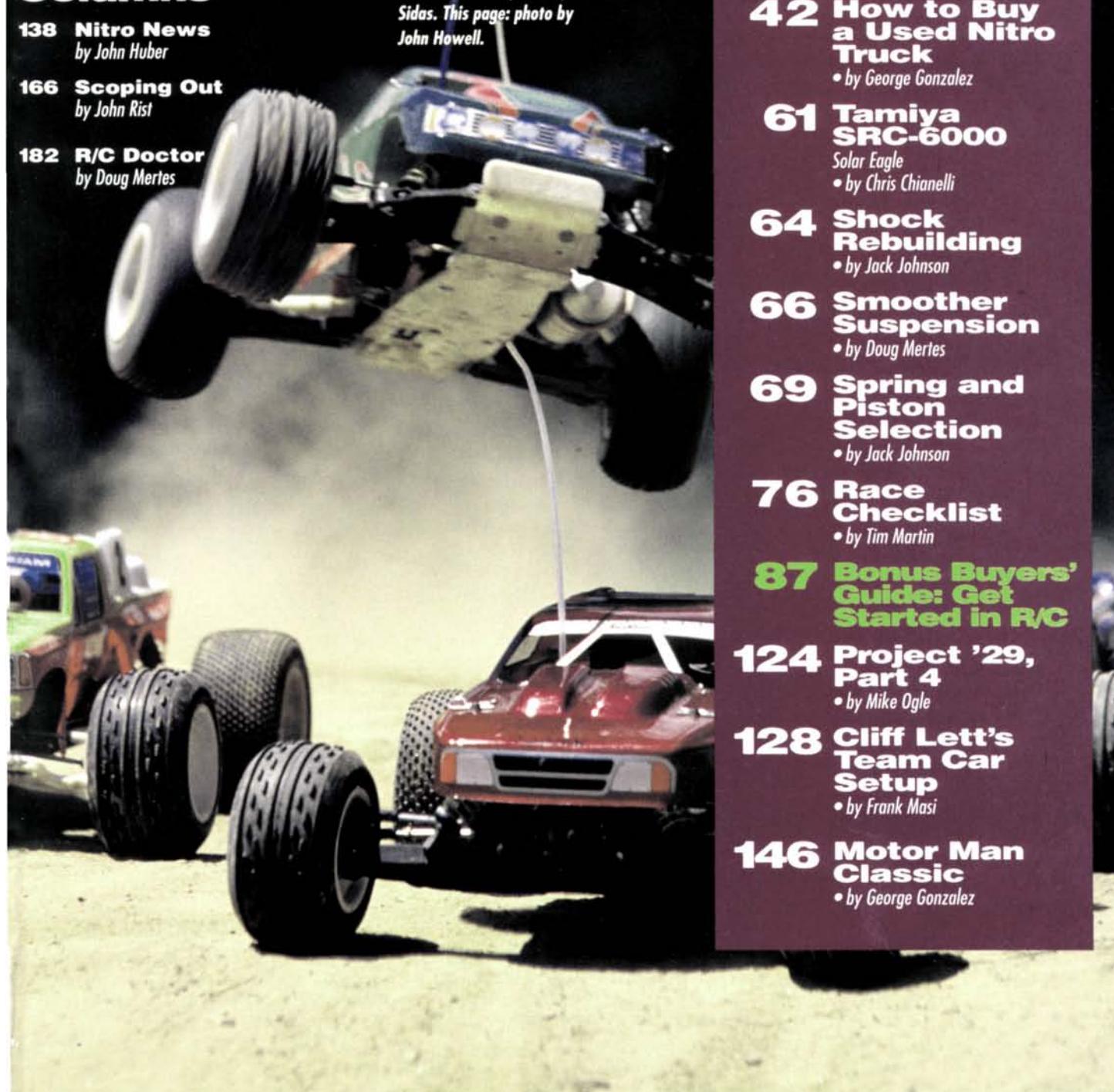
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Radio Control CAR ACTION

EDITORIAL

Keep on truckin'

I remember the first time I messed around with a $\frac{1}{10}$ -scale nitro truck; actually, it was one of the first conversion kits to hit the market—the Kunio Dudgeon 10T. The thing was so cool. I was really impressed by its unique design and awesome handling characteristics. At the time, I wasn't too sure about how the truck would affect the hobby, but I quickly saw that it had a major impact; there was definitely a need for fast, reliable nitro trucks that would handle well.

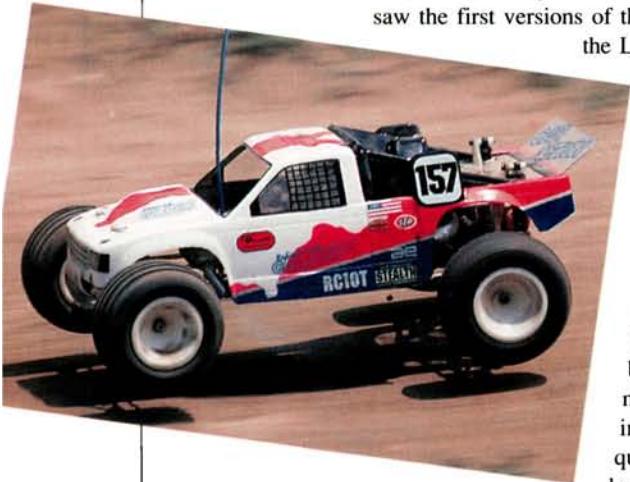
That same summer, at the '92 Kyosho World Challenge in Detroit, I saw the first versions of the DuraTrax RC10Ts and the LX-T prototype conversion

kits. One of the trucks went on to TQ at the event, and others have TQ'd and won at many other gas races since. Not too long after that race, the Traxxas Nitro Hawk popped up (the first gas truck built by a U.S.-based company). I began to think that if more manufacturers became involved, this class could quickly become one of the hottest racing divisions in

R/C. I guess I wasn't the only one thinking this way: Kyosho launched a brand-new, full-blown racing truck—the Outlaw Rampage Pro—and then, soon afterward, Team Associated debuted the RC10GT. More recently, Schumacher and Traxxas revealed that they were ready to release their all-new trucks—the Nitro Storm 2000 and the GRT. Insiders at Team Losi say that they have one in the works, too.

As you can see, the competition in this category is pretty stiff! So how's a person to decide which is the right nitro truck? Well, we've gathered all the hottest ones, and we're going to tell you everything you wanted to know about each and every one of them. And, if you can't shell out the bucks for a brand-new nitro truck right now, author George Gonzalez tells you how to buy a great used one.

And there's more! Want to know how to make your suspension operate more smoothly? How to rebuild your shocks properly? And what about the ins and outs of spring and piston selection? We'll fill you in. We've also tested the newest, hottest cars, so check out our Thrash Tests. And don't miss the first installment of our 1995 Buyers' Guide series: "Get Started in R/C." More sections—featuring radios, off-road, on-road, electronics and accessories—will follow in the coming months. Enjoy the issue, and let us know what you think!



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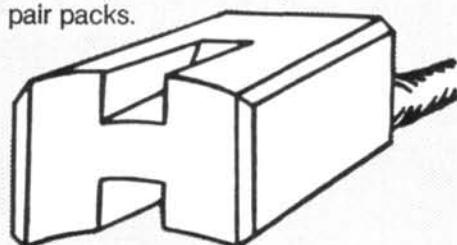
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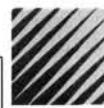
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LETTERS

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," *Radio Control Car Action*, 251 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

CONVERSION QUERIES

I'm writing to say that you have a great mag. I have a couple of questions. I've had a Team Losi JRX-Pro SE for about a year now, and I'm now interested in gas cars. I love my car, and I'm not interested in getting a new one. Do you know of any companies that make conversions that will change an electric car into a gas car? DuraTrax sells a conversion for the LX-T. Would that conversion work on the JRX-Pro with some modifications? What parts are needed to convert an electric car into a gas car? What would be a good, lower-price engine for it? Thanks for all the help.

NICK D'AMICO
Dayton, OH

Nick, I don't know of any conversions for buggies. You might be able to switch the DuraTrax LX-T version to buggy scale, but a buggy body probably won't fit. If you really want a 2WD gas buggy, take a look at the Traxxas Nitro Buggy or the Kyosho Sandmaster or Rampage. —John

GETTING STARTED

I was wondering if you could help me. I'm a first-time buyer, and I'm not sure about what kind of radio I want. The car I want is a Cox .049 Nissan GTP. It needs a 2-channel radio with microservos. I've been looking around for one like that, but the inexpensive ones don't have it, and I can't afford the ones that do. How much do you think a good radio will cost? Please help!

JASON STEFFENS
Crystal Lake, IL

Jason, the Cox Nissan GTP is available with a radio system for less than \$200. This radio system is called the Sidewinder, and it comes with the microservos you need to get it running. All in all, the Cox Nissan is a good deal

when you consider that it comes with an engine as well. I had one and had lots of fun with it.

—John

CHARGING CORRECTLY?

I love racing and have now bought a Traxxas TRX-1 and a set of matched Sanyo 1400s. At the track, before I charge them, I discharge them to below 2 amps, allow them to cool, and then charge them, but one of my teammates said that I don't take care of my batteries. Am I doing the wrong thing? I charge them on my Stone Age charger—an Astro Flight 114—until they're warm. Am I doing the wrong thing? Anyway, with that battery pack, I broke the track record for laps (18), and I won the A-Main, so I can't complain. Any help that you can give me will be appreciated.

STUART PEAK
Oshawa, Ontario, Canada

There are as many different methods of charging and caring for batteries as there are racers. If you're winning and breaking track records, I'd have to say that you aren't doing anything wrong! —John

PERFECT BODY?

I recently purchased a Traxxas Hawk 2. I'm in the market for a new body, but I can't seem to find anything that will fit my truck. What kind of truck bodies will fit my truck with little or no modification? Thanks, and keep up the good work!

BRIAN WEBER
Urbana, IL

Well, Brian, there are a lot of after-market body companies that might be able to help you out. Check with Parma, (216) 237-8650; Protoform, (905) 646-7638; Andy's, (909) 923-6155; and Dahm's,

(Continued on page 70)

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Part nos.—3304 (without radio system), 3310 (with pistol-grip radio system); **prices**—\$485, \$585.

Traxxas Corp., 12150 Shiloh Rd., #120, Dallas, TX 75228; (214) 613-3300.

ANTEX

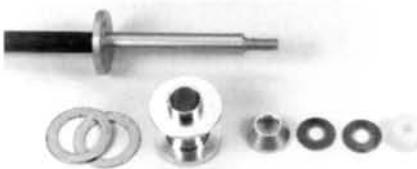
Portable Soldering Iron

This industrial-grade, 25W, 12V soldering iron can be connected to any automotive-type

12V battery and heats up to 800 degrees in less than two minutes. Supplied as a kit with solder and a plastic carrying pouch, it operates without butane or flames and is easy to store.

Part no.—MLXS; **price**—\$31.95.

M.M. Newman Corp., P.O. Box 615, Marblehead, MA 01945; (617) 631-7100. For more information, contact Charles Loutrel.



TEAM ASSOCIATED

1/12-Scale Stealth Diff Kit

Associated developed this kit for serious 1/12-scale racers. With it, your 12L

Series car will be more competitive than ever. The kit includes everything you see here, plus diff balls and full assembly instructions.

Part nos.—4450 (diff assembly), 4451 (graphite rear axle), 4452 (wheel hub/spacer); **prices**—\$22, \$18, \$3.

Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626; (714) 850-9342.

(614)231-4170

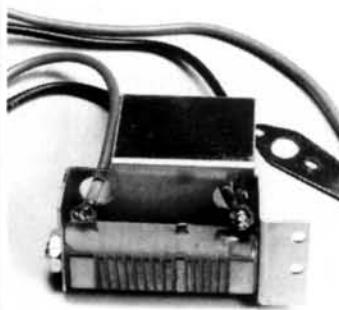


BOLINK Resistor Speed Controller

This new, less expensive version of Bolink's 4620 speed controller is for races in which you don't need reverse (or it isn't allowed). It has the same heavy-duty resistor and wiper arm that are used in the 4620, and it can be mounted on a servo of any size. It comes assembled with Tamiya-style plugs, and it's a perfect choice for Bolink's R/C Legends cars.

Part no.—BL-4620-B; **price**—\$14.95.

Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245; (404) 963-0252; fax (404) 963-7334.



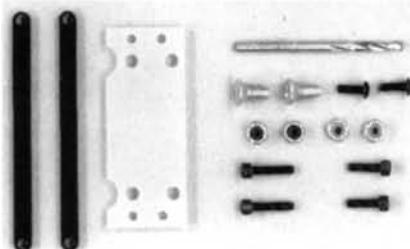
MIP

Stretch Kit for RC10GT

Improve stability, steering and cornering speeds by stretching your RC10GT to the maximum legal length. This kit, which will make your RC10GT nearly $\frac{3}{8}$ inch longer, includes MIP nose braces, hardware and a template and a no. 32 drill to help you accurately drill the new hole pattern.

Part no.—3011;
price—\$14.95.

MIP, 746 E. Edna Pl., Covina, CA 91723; (818) 339-9008.



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Each of Wiha's four compact tool sets contains a different blade/tip combination, but all include the distinctive Wiha adjustable handle that allows you to vary the blade's length from 0.6 inch to 3.75 inches. For increased control, the handle has a fingertip rotation cup on its end. Each set comes in a compact, indexed storage box that opens to display your tools.

Part nos.—26995 (5-piece Torx set), 26996 (5-piece Slotted/Phillips set), 26997 (9-piece Slotted/Phillips/Torx set), 26998 (9-piece Metric Nutdriver set).

Bondhus Corp., (800) 328-8310; for more information on Wiha tools, contact Patty Knese.



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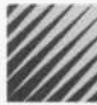
• • •

Aero-Car Technology introduces a new lubricant for use in gearboxes and gear differentials. Developed for the aerospace industry, this lube can reduce amp draw by as much as 28 percent and increase gear and gear-diff life by 250 percent. It's non-toxic and environmentally safe, and it won't harm plastic, nylon or polycarbonate.

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For more information, contact:

Aero-Car Technology Inc.
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(708) 246-9027



WHAT'S NEW

PRO-LINE

Stubbie "T" Tires

Pro-Line's newest XTR tire is the Pro-96 Stubbie "T." Used to dominate the 1993 IFMAR Worlds, the world-championship design has been combined with a new, lightweight, internally reinforced carcass, so it's the perfect truck tire for any 2.2-inch truck wheel on hard to high-bite tracks.

Part no.—8096; **price**—\$17.95.

Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781.



TAMIYA

Tamtech F1 Cars

Tamiya Tamtechs deliver full-size racing action in $\frac{1}{14}$ scale. Shown here are the Ferrari 643 and the Lotus 102B; each comes fully equipped with a powerful, compact, 370-type motor; a precision gear differential; a pistol-grip radio;

a 2-channel transmitter; an integrated P-05DB receiver/speed controller unit; and a steering servo. A full complement of hop-up options are also available.

Part nos.—47008 (Ferrari),
47009 (Lotus).

Tamiya America, Inc., 2
Orion, Aliso Viejo, CA 92656;
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Team CRC claims that their "Cool-It" motor heat sink is the lightest on the market, and it has plenty of surface area for increased cooling. Check it out at your local dealer.

Part no.—5005;

price—\$22.95

Calandra Racing Concepts, 6860 Stanwix Ave., Rome, NY 13440;
(315) 338-0867.





PARMA

1994 Trans-Am Camaro Z-28

Now R/C racers can get the aerodynamic advantage the full-size Camaro brought to Trans-Am racing! Designed with racing in mind—and with attention to scale detail—this new body will fit standard-width on-road chassis.

Part no.—99025; **price**—\$19.95.

Parma/PSE, 13927 Progress Pkwy., North Royalton, OH 44133;
(216) 237-8650.



PARAGON

Formula 1 Motor Bath

Rid your motor of power-robbing dirt, grime and other impurities by submerging it in this non-spray version of Formula 1 (just pour it out). It's also excellent for cleaning bearings and other moving parts.

Part no.—F107B; **price**—\$7.95.

Paragon Racing Products, 340 Industrial Blvd.,
Waconia, MN 55387; (612) 442-6364.

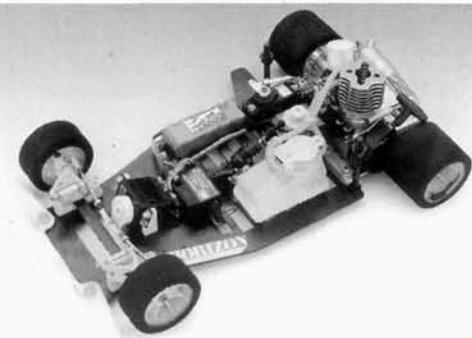
DYNAMITE

10L Gas Conversion

This conversion kit includes everything you need to turn your 10L electric kit into a 10L nitro-burner: drilled and tapped engine mounts, an aluminum flywheel, a two-shoe racing clutch, a clutch bell, a rear aluminum pod, a G10 throttle servo mount/damper plate, a quick-fill 75cc fuel tank and photo-illustrated instructions. Two kits are available: no. 5610 includes Dynamite's TNT .12 pull-start engine, a muffler and an air-filter kit; no. 5612 comes without an engine.

Part nos.—DYN5610,
DYN5612; **prices**—
\$229.95, \$119.95.

Dynamite; distributed
by Horizon Hobby
Distributors, 4105
Fieldstone Rd.,
Champaign, IL 61821;
(217) 355-9511.



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TEAM SECRETS

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ADVERTISEMENT

I'M SURE that there are still many people who are afraid to get into gas trucks. A few things are tricky at first, but once you learn the basics and get the engine fired up, you'll be amazed at how much real run time you can get.

A fast electric truck will run for 4 to 5 minutes on one charge; a gas truck will run for at least 10 minutes on one tank of gas. Let's say that you want to run a truck for a solid 30 minutes. With an electric truck, you'd need six battery packs. You would, of course, have to spend an hour and a half charging them before you started, and you'd also spend a few minutes swapping the packs each time they died.

With a gas truck, you might need to spend 5 minutes getting the carb set right. Once you've taken care of that, you'll only need to stop twice to fill up and to check the engine temp. The only charging you have to do is to trickle-charge your receiver pack the night before.

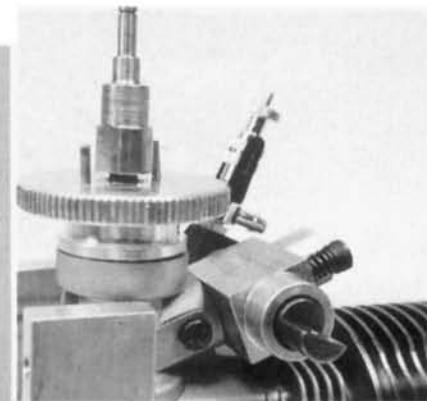
As you can see, the benefits of gas trucks are worth looking into. Here are a few pointers that will help to make your first attempts go smoothly.

For nitro newcomers.

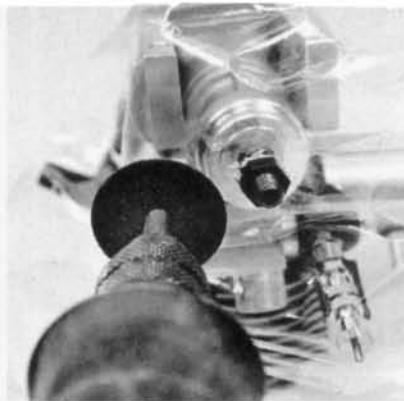


Gettin' into Gas

by JOHN HUBER



To determine whether you have to cut the crank, pre-assemble the flywheel, spacers and clutch nut.



Use a Dremel tool or a hacksaw to cut the crank. To prevent metal fragments from getting into it, put the engine in a plastic bag.

Cutting a Crank

To mount some engines' clutch assemblies, you might have to cut threads off their crankshafts. If you've just spent more than \$100 on an engine, the last thing you want to do is cut something off it. But don't worry; it's very simple and painless.

To determine whether you need to cut it, assemble the flywheel

and spacers that are necessary to make the engine fit. If there's more than $\frac{1}{2}$ inch of threads showing, you might need to trim the shaft. Thread the clutch nut onto the crank as far as it will go. If there's a gap between the bottom of the clutch nut and the flywheel, measure the gap. To tighten the nut properly, you'll have to cut a little more than the width of the gap off the crankshaft.

Before you cut anything off the engine, put it into a Ziploc bag to protect it from small particles of debris. Push the crank through the bag to expose the part you want to remove. Put a piece of tape around the edge of the hole to ensure that the bag is sealed.

To cut the crank, you'll need either a hacksaw or a Dremel tool with a cutoff wheel; the hacksaw will do the job, but the Dremel tool will be neater. If you choose a hacksaw, I suggest that you thread a nut onto the shaft first. The nut will clean the threads when you remove it. Put on your protective eyewear and start cutting! Make sure you cut straight and clean. Once you've removed the piece, use a small file to clean any burrs off the end of the shaft. And that's it!

(Continued on page 174)

INSIDE SCOOP

by CHRIS CHIANELLI

IN SEARCH OF FUN AND GLORY, 'CAUSE LIFE'S TOO SHORT TO BE A SHEEP!



TRX .12
IS HERE

out of the crankcase so that they don't interfere with fuel flow. Stay tuned for details.

Traxxas is offering two new versions of the new .12 engine: an RTR (ready-to-run) version with a cast head and conservative timing, and a race version with a machined head and conrod and more radical timing. The TRX .12 features a high-quality piston/sleeve fit and a new carb with rubber seals and O-rings that eliminate air leaks. High-performance sleeves with more radical porting will also be available. The new pull-start design moves components

out of the crankcase so that they don't interfere with fuel flow. Stay tuned for details.

Drag Works Cobalt

This new samarium cobalt magnet motor from Trinity Products is light (4.9 ounces) and has a can that's fully machined out of a solid billet of iron. The trick feature is the use of a standard .05-size armature so that you can combine an armature with a wind of your choice with the cobalt magnets. Springs and brushes are also standard .05 equipment. Dimensions: diameter—1.22 inches (31mm); length—2.04 inches (52mm); shaft diameter—0.125 inch (3.22mm). Available in two winds: an 18-turn rated at 22,500rpm at 20 amps and 7 volts and a 15-turn rated at 27,000rpm at 20 amps and 7 volts. Contact Trinity Products Inc., 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705, fax (908) 862-6875.



FUTURE SHOCK



June 12, Sunnyvale, CA—Georg Esterer ran the fastest speed ever recorded (105mph) with an R/C car at a special "Land Speed Record" event at NCDA (North California Drag Association) Raceway. The run was backed up with a 104mph pass on the 330-foot course. Two sets of timing clocks were used to substantiate the runs. Georg used a Protoform Future

Shock dragster body on a Lightz chassis powered by a 20-cell Astro Flight motor.

Two weeks later, Kent Vahlsing, the

foot strip. Kent used the Protoform Top Fuel 1 body (foreground) to make these impressive runs with his Astro-



105 mph!

reigning IEDA champion, made five passes in less than 1.77 seconds—the quickest being 1.72 seconds on a conventional 132-

powered Lockman dragster chassis. Contact Protoform, 5455 S. Western Blvd., Hamburg, NY 14075; (905) 646-7638, fax (905)

Dahm PHANTOM

This custom-chopped '32 coupe from Dahm's Racing Bodies fits Tamiya and Kyosho F1 chassis, Parma's Hemi Coupe/Vette chassis and the Lightz Pro Stock chassis. The Phantom, molded of .030 GE Lexan, can be built with Parma's Hemi engine if you leave off the tranny and the oil pan. For more information, call Dahm's at (707) 792-1316, or fax them at (707) 792-0137.



Have you ever driven an old jalopy down the street—you know, like the '52 Packard your grandfather would point to and say, "They sure don't make 'em like that anymore!" You'd have to plan your intended heading well in advance because the steering wheel needed to be turned a full half turn before the car even started to respond! You don't want play or flexing in the steering system of your R/C car either.

Installing Hangar 9's machined servo arm and ball-link kits could noticeably improve your car's steering response. The arms are machined out of bar-stock aluminum and have threaded 2mm holes. The ball-link kits include everything needed to

connect 2-56 or 4-40 threaded rods. The balls are polished brass, and the links are made of thermally stable plastic. The two fit together with zero slop. A brass cone standoff provides clearance between the arm and the link. Contact Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511.

Winning is What Separates Champions From Everyone Else And We've Won It All

- IFMAR 1/10th, On-Road Modified World Championship** - Joel Johnson
- ROAR 1/10th, On-Road, Modified National Championship** - Joel Johnson
- ROAR 1/12th, On-Road, Modified National Championship** - Joel Johnson
- 4-Cell Modified Winter National Modified Championship** - Mike Blackstock
- U.S. Oval Masters Modified Championship** - Mike Blackstock
- ROAR 1/10th Speedway Modified National Champion** - Ernie Buck

Trinity Team Pushed battery championships are all in super-competitive national and international modified pro-class racing, not in stock or regional event

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Trinity Products Inc., 1901 E. Linden Ave #8, Linden, NJ 07036 • (908) 862-1705 • Fax (908) 862-6875

Will Diesel Dominate the Dust?



Did you know that Davis Model Products, makers of diesel conversions for R/C aircraft for many years, produced diesel conversion kits for the Cox Jerobee cars way back when? Well, with the popularity of 1/10-scale truck racing, they've decided to get back into it. Pictured here is Tony Meroth's RC10GT with a "dieselized" O.S. CZ .12 running in humid, 100+

degree Florida temperatures with no ill effects, owing to the cool running characteristics of the diesel. The reports that have come back to me go something like this: "The diesel O.S. will eat anything on the track"; "It'll burn rubber on asphalt and do wheelies in high grass"; "The idle is great with fantastic top end." These statements come as no surprise considering what the diesel has accomplished in the airplane and helicopter

world. Tony's RC10GT is equipped with an MIP replacement clutch to handle the extra power. We're now looking into a full report for the future. For further information, contact Davis Model Products, P.O. Box 141, Milford, CT 06460; (203) 877-1670.



Pro-Racer Silicone Shock Oil

"Whether you race at the North Pole or the new track in Hell, our oil stays true to weight."

- Oil weight remains stable under increasing track heat, so suspension set-up won't change
- 1/2 weights from 10-70
- Allows precise tuning of your suspension to match changing track conditions



**\$2.99
All Weights**

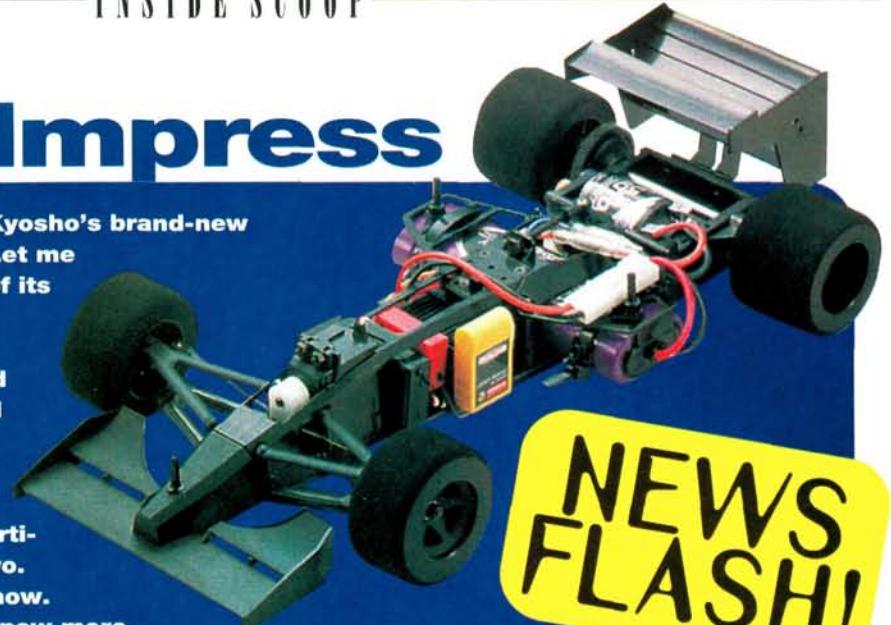
TRINITY

Trinity Products, Inc.

1901 E. Linden Ave, #8 Linden, NJ 07036
(908) 862-1705 • Fax (908) 862-6875

Kyosho Impress

Just in! Here's look at Kyosho's brand-new F1 car—the Impress. Let me tease you with a few of its new features: a Reactive Caster front end with adjustable reaction rate and adjustable static caster and static camber, fiberglass chassis, redesigned rear damper, a new ball diff and a new upper deck with a vertically mounted steering servo. That's all I can tell you for now. When I know more, you'll know more.



NEWS FLASH!



Condition as you **CHARGE**

According to Schumacher, their new Micro CCD20 Flex Charger is a charging, cycling and discharging system that has all the features needed to keep your sub-C Ni-Cd packs in top condition. The CCD20's bubble-charging circuitry provides a method of charging Ni-Cds that uses 1-second periods of pulse charge followed by a short-duration,

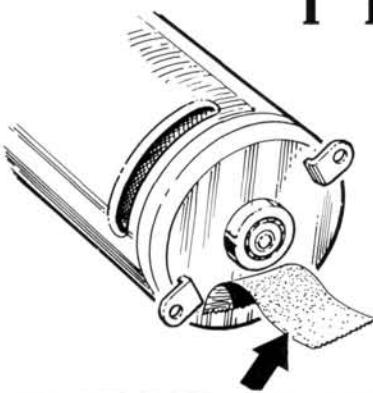
high-current discharge pulse. The charge/discharge pulsing is repeated until the pack is charged. This type of charging is reported to remove "memory" effects, restore lost capacity, improve charging efficiency and increase Ni-Cd life. Contact Schumacher USA, 6302 Benjamin Rd., Ste. 404, Tampa, FL 33634; (813) 889-9691, fax (813) 889-9593.

Recently, Richard Muise of Motion Graphics presented this replica of the 1993 Indianapolis Pace Car to Jim Perkins, general manager of the Chevrolet Division of General Motors. While in Detroit, Rich was treated to a tour of the GM design center, where he met with many of the design/engineering staffers and viewed early clay models of the 1998 Corvette. Obviously, cameras were restricted—very top-secret stuff. Rich's comment: "Awesome—a dream come true!" The replica is one of Motion Graphics' remarkable paint jobs on a Protoform body. Need a one-of-a-kind creation of your own? Contact Rich at (410) 848-0008 for details.

**Motion
Graphics
Honors
DETROIT**

PIT TIPS

by JIM NEWMAN



BEARING DIRT EXCLUDER

A small piece of adhesive tape over the rear bearing or bushings on your electric motor will keep out dirt and increase the motor's life.

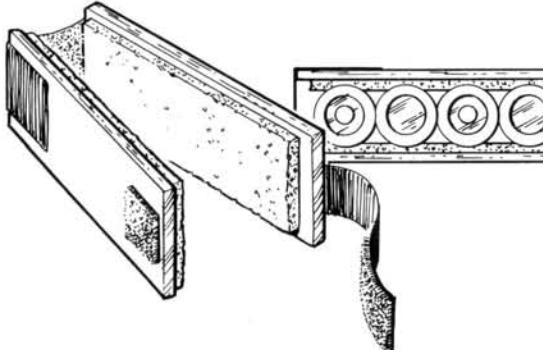
David Tsui, Cliffwood, NJ



SPRAY-TUBE STORAGE

Glue a piece of Velcro®-brand fastener to the side of your spray can, and trap the spray tube under the top layer.

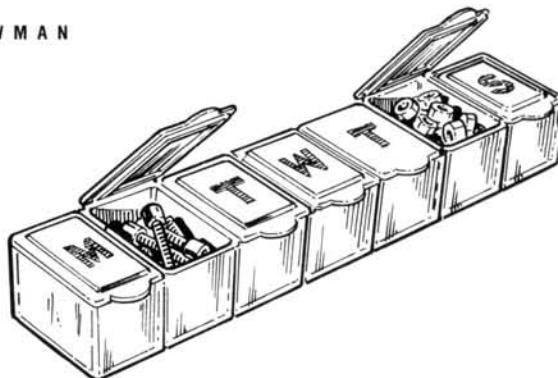
Bryan Dove, Sugarland, TX



NI-CD SOLDERING JIG

While you solder battery connections, hold the Ni-Cds firmly in line between two pieces of $\frac{1}{8} \times 1\frac{1}{4} \times 6$ -inch wood. Pad the inner faces of the wood pieces with thin foam; hinge them with duct tape at one end; and hold them together at the other end with Velcro®-brand fastener.

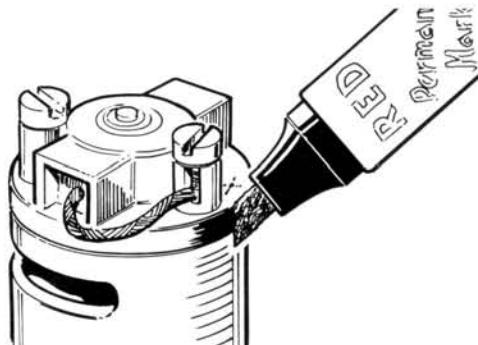
Jason Paul, Dover, NH



HARDWARE ORGANIZER

Organize the spare hardware in your pit kit in a pill container from the drug store. For instant reference, each box section can be labeled to show its contents.

Andy Basile, South Holland, IL



POSITIVE AND NEGATIVE MARKINGS

Positive and negative terminal markings aren't always easy to read. Use a permanent marker or paint to mark a large spot on the endbell next to the terminals—red for positive and black for negative.

Eric D. Roberts, E. Lansing, MI

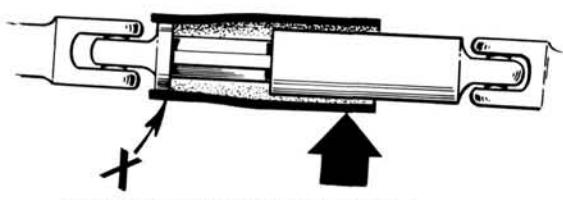


NI-CD COOLING BOX

A plastic storage box will hold blue ice packs in a re-sealable Ziploc bag. After charging or running your Ni-Cds put them on the ice packs to cool. Heat rises, so why not put ice packs on top, too?

Marvin Blake, Kansas City, KS

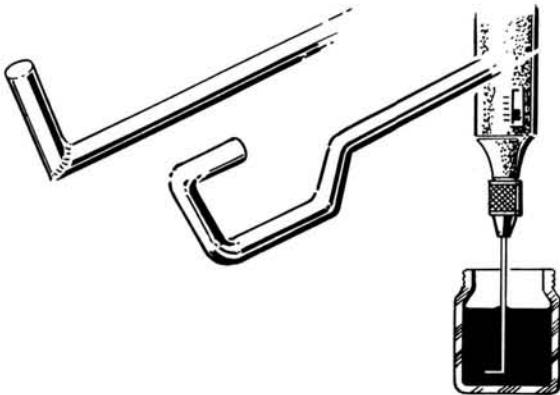
PLEASE NOTE: be sure to print your name and full address clearly on every letter and sketch you send to "Pit Tips." We can't publish many good tips because we don't have the senders' names or addresses.



DIRT EXCLUDER SLEEVE

A piece of heat-shrink tubing, shrunk only at point "x," covers the sliding splines of the drive shafts and prolongs their life by protecting them from dirt. The part of the tubing that hasn't been shrunk is free of the slider shaft and allows the drive shaft to "telescope" properly without binding.

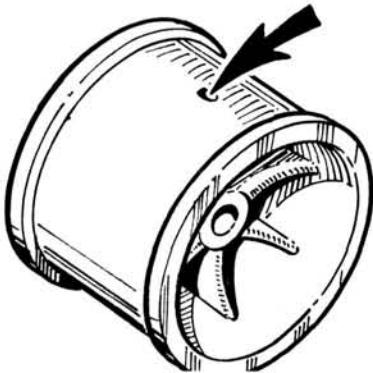
C.C. Lanier, Maricopa, AZ



QUICK PAINT MIXER

Notch, bend and solder a length of thin brass tube, insert it into the chuck of your Dremel tool or drill, and run it at a very low speed to mix settled paint. You could also make a simple mixing hook out of a large paper clip.

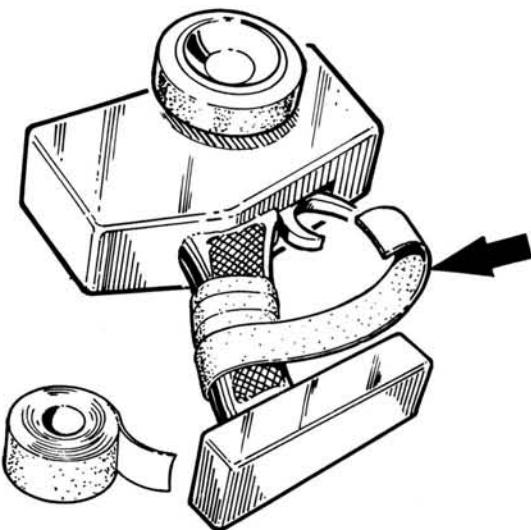
Amory Diccion, Pittsburgh, PA



TIRE VENTING

Before you install your tires on the wheel rims, drill a $\frac{1}{16}$ -inch hole in each rim. The holes will release trapped air, and you won't have to pierce your tires.

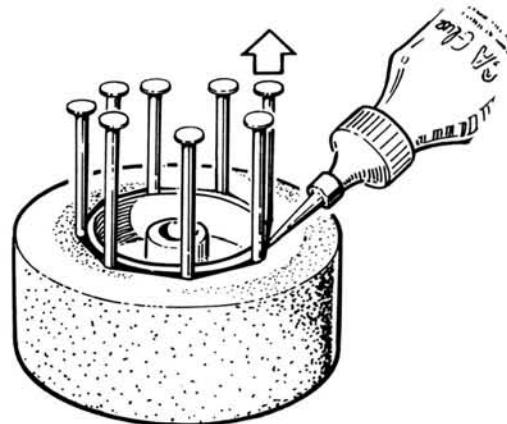
Donald Mertz Jr., Clarksboro, NJ



TRANSMITTER COMFORT GRIP

Wind soft tennis-racquet-grip sponge tape around your transmitter grip; it will significantly increase comfort and reduce the likelihood of sweaty palms.

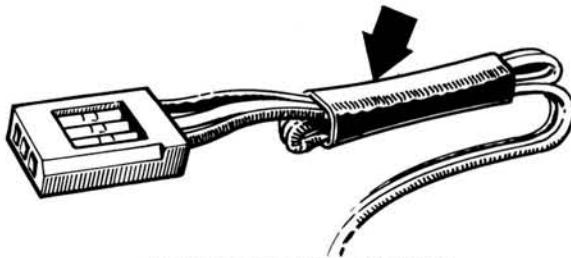
Dan Wachdaf, Prattville, AL



SIMPLE TIRE GLUING

After fitting a tire on a rim and aligning them, insert several nails as shown. Put a drop of CA into the slot formed by one nail, then quickly extract that nail before dropping glue into the next slot. When you've finished gluing one side in this way, turn the tire over to repeat the procedure on the opposite side.

Tony Kostura, Fountain Hills, CA



TIDY SERVO WIRES

Shorten long servo wires by folding them back and forth and securing the folds with a heat-shrink sleeve.

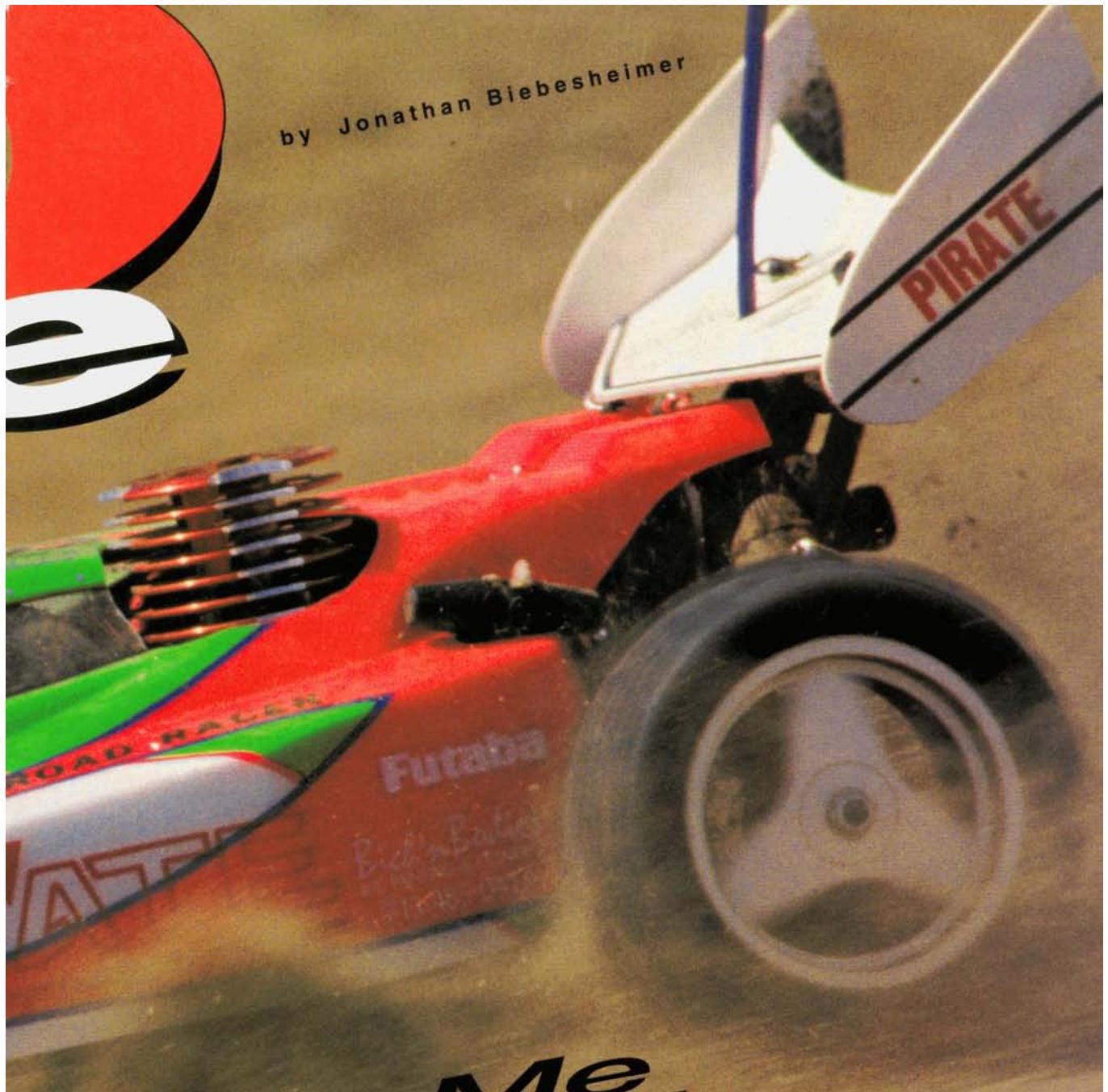
Jerry Dotson, Puyallup, WA

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o **Radio Control Car Action**, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

CAR ACTION
THRASH TEST
1/10 SCALE GAS

OFF N A
Pirate





Shiver Me Timbers!

Off-road gas cars are just about the most fun R/C cars around. You're totally free to roam the perils and pitfalls of just about any open space (at least until your nitro runs out!). To cover a wide range of terrain, I've tried a few R/C options. First I tried an electric monster truck, which is great for scaling the most insane obstacles imaginable. Then I was hooked on $\frac{1}{10}$ -scale nitro off-road stadium trucks, which offer thrilling rides on bumps, jumps and crazy turns. For a long time, the only next step was an $\frac{1}{8}$ -scale 4WD off-road gas buggy (which is really a jump!), but now there's an intermediate alternative—the new $\frac{1}{10}$ -scale Pirate 10 from OFNA*. If you want the great features of a 4WD off-road gas buggy without leaping into the world of $\frac{1}{8}$ -scale racing, the Pirate 10 is the car for you!

by Jonathan Biebesheimer

For those of you who are thinking, "Gee, that name sounds familiar," the Pirate 10 is the little brother of the Pirate M1 and RS. Although their basic designs are similar, the Pirate 10 is unique. OFNA sent me a production sample of the Pirate 10 that came almost completely assembled (as will the kits). Although I didn't build the car from scratch (and, therefore, can't offer any building tips), it wasn't long before I was tinkering with the car to see what made it tick. I was impressed to find that it not only has a great design, but it's also packed with features that will make even a pro smile!



The rear anti-roll bar helps maintain a controlled ride.

CONSTRUCTION

The car's base is a narrow aluminum pan chassis. The aluminum is very light, yet supportive enough to withstand the beating it gets off-road. Drilled, countersunk holes in the chassis allow for a clean underside that doesn't dig up rocks and other debris while racing. Because the Pirate 10 is 4WD, the chassis is really packed. It has three diffs: one in the front, an identical one in the rear and a larger one in the center. These all-steel, bevel-gear diffs are remarkably smooth. Massive plastic drive shafts transfer the power from the center diff to the front and rear diffs. The gear on the center diff is made of very rigid plastic, which worried me at first, but when I ran the car, I realized that it handled the job well. An aluminum center disk brake is also incorporated in the drive system. It's probably the best brake I've ever used; it locks the car up to a complete stop from full speed in a few feet!

The more I poked, the more solid I found the Pirate 10 to be. The car has very nice aluminum shock towers and amazingly tough front and rear bumpers. Very heavy-duty plastic suspension arms—a lower support arm and an upper arm that adjusts the tires' camber—are attached to the front and rear gearboxes. The front also has steel

Scale.....	1/10
Price	\$349.99

DIMENSIONS

Overall length.....	15.5 in.
Wheelbase	0.75 in.
Front width	9.75 in.
Rear width	9.75 in.

WEIGHT

Gross (ready to run)	3.2 lb.
-------------------------------	---------

CHASSIS

Type.....	Pan
Material.....	Aluminum

DRIVE TRAIN

Type	Gear
Primary.....	Pinion/spur
Transmission	Gear
Differential(s)	Steel bevel gear
Slipper clutch	None
Bearings/bushings	Bearings

SUSPENSION

F/R: Type.....	4W independent w/rear anti-roll bar
Damping	Oil-filled, coil-over shocks



WHEELS

F/R: Type.....	One-piece plastic
Dimensions (DxW)	2.25x1.40 in.

TIRES

F/R.....	Semi-pneumatic small pin
----------	--------------------------

ENGINE

Type.....	Dynamite TNT .12 (not included)
Pipe.....	Dynamite stock
Carb.....	Dynamite stock

ELECTRONICS: Futaba PCM 1024 (FP-T3PB) radio; Futaba FP-R113IP receiver; Futaba FP-S148 throttle servo; JR NES-4735 steering servo; 5-cell, 600mAh receiver battery pack.

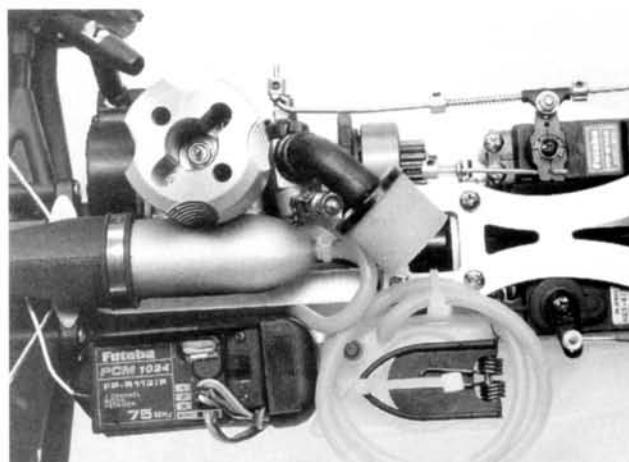
OPTIONS TESTED: OFNA off-road contoured spikes and Pro-Line Road Hawg street tires; Dynamite Lightning Line fuel tubing.

HITS

- Outstanding features • High-quality parts • Excellent ride and handling • Good reason to make dumb pirate references

MISSES

- Shocks could be of a higher quality • The spring on the fuel-tank cap makes it impossible to open!



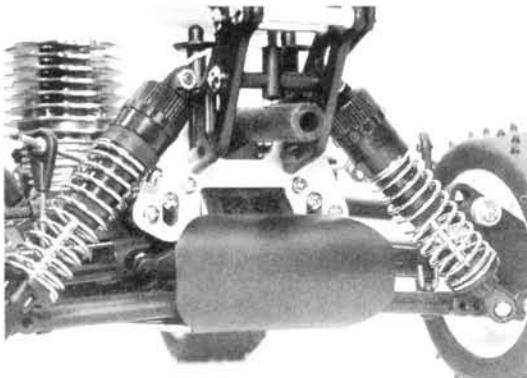
The chassis is packed with three diffs for 4WD, an extra-large 75cc fuel tank and a protected battery and receiver tray.

turnbuckles to adjust the front tires' toe-in. Beefy plastic slider universals, which drive the tires, stem from the gearboxes.

The Pirate 10's plastic shocks are more than adequate when they're filled with oil of the proper weight. I replaced the oil that came in them with Losi's* Silatech 425 (Orange); this made a tremendous difference in the car's ride. Be careful when you adjust the shock springs with the pro-



Without a doubt, the Pirate 10 is a first-rate machine. Although it's a bit more complex than some cars, its great design makes it easy to manage.



A hefty rear bumper and an adjustable wing support are just a few of the features that make the Pirate 10 great!

vided spring collars: if you over-tighten the collar, the plastic body of the shock will compress and the piston will catch as it goes up and down. Because this happened to me, I chose to use (and recommend) using snap-on rings for adjustments, like the ones from RPM*. Or, if you really want to go for it, treat yourself to a nice set of aluminum shocks! The other suspension feature to note is the rear anti-roll bar. When one of the rear tires is lifted, the anti-roll bar slightly raises the opposite rear tire. Although it's a very simple contraption, it's very effective in improving the handling of the car, particularly on rough terrain.

Installing the engine and the electronics was the only thing that I had to do to the Pirate 10. I chose a Dynamite TNT .12 engine with a pull-starter. If you plan to use a non-pull-start engine, you'll need to buy the optional lower engine mount.

The muffler that comes with the Pirate 10



The Pirate 10 tank has a unique raised ridge around the flip-top that directs over-filled fuel to the bottom of the chassis.

kit is a two-piece design: the front (pressure manifold) is aluminum, and the rear is rubber; this acts as a silencer (it actually works!). If you plan to use a Dynamite engine with the Pirate 10's pipe, you'll have to rotate the carburetor by about an eighth of a turn to make it fit properly. The Pirate 10's clutch assembly is very straightforward; it fits on the Dynamite drive shaft with only a slight cut in shaft length. After mounting the engine and installing some Dynamite's* Lightning Line fuel tubing to the Pirate 10's 75cc tank, I was ready for the electronics and almost ready to ride!

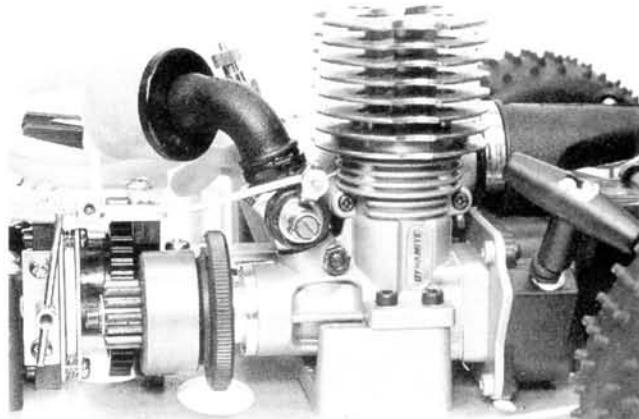
The Pirate 10 has a nice battery/receiver tray at the rear of the gas tank. For the servo battery pack, you can use either a regular-size 4-cell pack, or the recommended, short, 5-cell pack, which is what I chose. For the throttle, I used a standard Futaba servo (the Pirate 10 kit comes with throttle linkages for both normal and slide-carburetor engines) and went all-out with a JR* NES-4735 lightning-fast servo for steering. After I had quickly checked the servos and made a few cutouts in the radical body I had just received from Scott Bich at Bich'n Bodies*, the time I had been waiting for had come!

The Pirate 10 drove as well as I could have imagined. Starting slowly (to break the engine in) and working my way faster, I tried to hit as many surfaces as I could to see how much better the 4WD really was. I was totally amazed at the Pirate 10's control—both in steering and acceleration. The days of peeling out in circles are over; when you hit the throttle, the Pirate 10 takes off! And cornering? I did everything I could to shake the car into a spin, but had no luck. Even on loose, fine gravel, the car stuck to whatever curve I was trying to make. The car's capability to handle bumps (not just bumps, but *bumps!*) impressed me even more. Whether I thrashed

it through small, tight bumps or large ruts, the Pirate 10 maintained its composure and always (well, almost always!) landed on its feet.

The Pirate 10 comes with a set of small pin tires. A set of very aggressive, contoured spike tires is also available. The small pins were the best on most surfaces, e.g., hard-packed dirt, loose dirt, gravel, mud and low-cut grass. For even more insane traction on grass, try the contoured spikes!

To satisfy my curiosity, I got my hands on a set of Pro-Line* Road Hawg street tires. The ride on-road was just as good as that off-road. In fact, the car handled almost too well on-road! On many occasions, I found that the car responded way beyond my expectations and completely flipped over. Thank goodness the rear wing is made of flexible plastic!



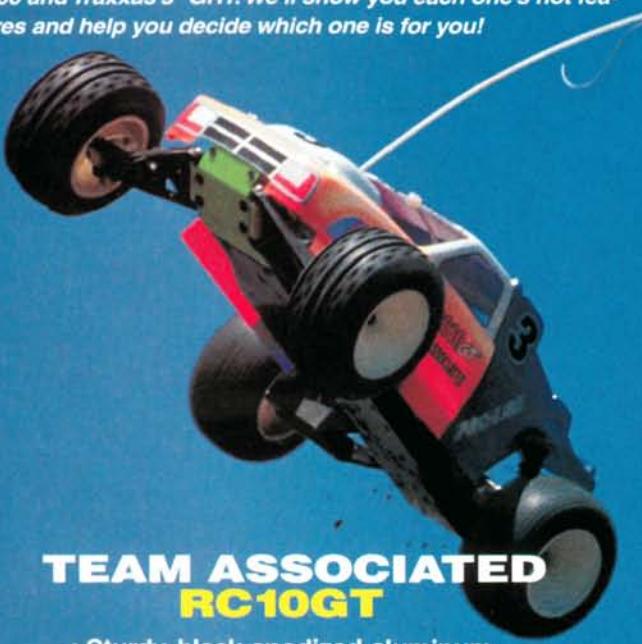
I chose the Dynamite TNT .12 engine and used the kit's clutch assembly; the disk brake in front of the clutch can really lock 'em up!

Without a doubt, the Pirate 10 is a first-rate machine. Although it's a bit more complex than some cars, its great design makes it easy to manage. The Pirate 10 is packed with great features and very high-quality parts (I lost count at 15 bearings!) that make it both highly competitive and just plain fun to race and drive recreationally. For off-road R/C drivers who like to take small, careful steps (like me), the Pirate 10 is a great bet. Give it a try; I guarantee that after a few minutes of racing, you'll be shouting, "Shiver me timbers!"

*Addresses are listed alphabetically in the Index of Manufacturers on page 153.

PICK

NITRO RACING trucks are hot! Luckily for us, there has recently been a lot of growth in the $\frac{1}{10}$ -scale nitro-truck division. Almost all the major manufacturers have a new fuel burner in their truck lineup, or they have one in the works. Quite a few after-market companies have also jumped on the nitro bandwagon. From heat-sink heads to high-performance pipes—you need it, they've got it! Racing has become more intense in this class, too. I remember going to gas races a couple of years ago and seeing only enough entrants to run one Main. Now, more and more $\frac{1}{10}$ -scale nitro trucks are hitting the tracks, the competition is stiffer, and your truck must be able to hang with the big dogs. With that in mind, take a look at four of the hottest factory-built nitro racing trucks—Team Associated's* RC10GT, Kyosho's* Outlaw Rampage Pro, Schumacher's* Nitro Storm 2000 and Traxxas's* GRT. We'll show you each one's hot features and help you decide which one is for you!



TEAM ASSOCIATED RC10GT

- Sturdy, black-anodized-aluminum tub chassis
- Disk-brake system
- Hard-anodized Team shocks
- Two-shoe clutch
- flip-top, quick-fill, 75cc fuel tank with built-in sintered-bronze fuel filter
- Stealth tranny with slipper clutch
- Universal drive shafts
- Pro-Line tires

TRAXXAS GRT

- Dual-plane chassis (lower aluminum plate, upper fiberglass stiffener/radio tray)
- Disk-brake system
- Big-bore, hard-anodized shocks
- Centrifugal clutch setup with slipper clutch
- Quick-fill, flip-top, 75cc fuel tank
- Three-gear transmission
- Telescopic slider shafts
- Available with or without the new Traxxas .12 engine



NITRO

PHOTOS BY JOHN HOWELL & JOHN HUBER

YOUR

KYOSHO OUTLAW RAMPAGE PRO

- Rigid blue-anodized-aluminum semi-tub chassis with molded-nylon upper brace
 - Drum-brake system
 - Ultimate hard-anodized shocks
 - Three-shoe clutch with slipper that will accept Hydra-Drive
 - Flip-top, quick-fill, 75cc fuel tank
 - SST tranny
 - Universal drive shafts
 - Two-piece clutch-bell/pinlon gear
 - Removable radio tray

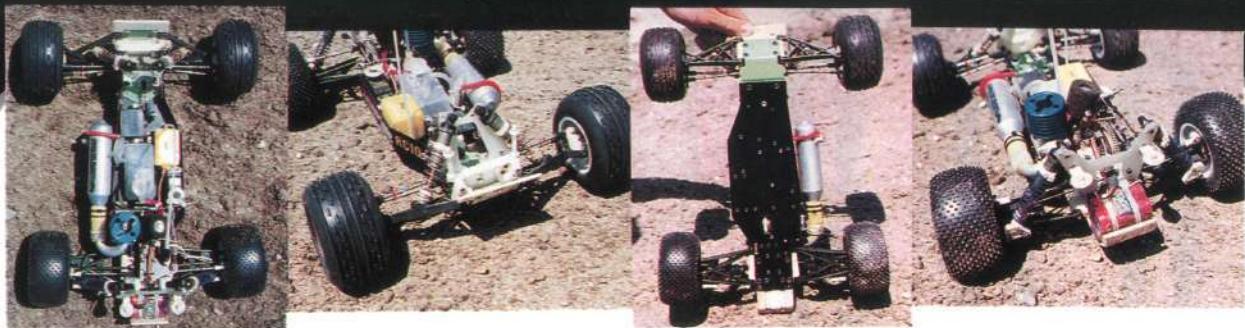


SCHUMACHER NITRO STORM 2000

- Ultra-thick, lower, blue-anodized aluminum chassis with upper fiberglass brace/radio tray
 - Disk-brake system
- Pro hard-anodized shocks with adjustable pistons allow you to change the damping without changing oil viscosity
 - Two-shoe clutch
 - Flip-top, quick-fill, 75cc fuel tank
 - Kevlar belt-drive transmission
 - Coaxial drive shafts
 - Readily accepts .12 engines

TRUCK

by JOHN HOWELL



The Team Associated RC10GT's geometry is very similar to that of its electric counterpart, the RC10T, and—also like the RC10T—the

RC10GT has already proven itself to be a winner. Just ask MIP* team driver B.J. Christensen. At the recent Mid-Atlantic Gas Challenge in King, NC,

B.J. piloted his RC10GT to an A-Main win, followed by his teammate and sponsor Eustace Moore, who was also driving an RC10GT.

coated Team shocks and the same one-piece wheels as the 10T. Even the chassis is similar; it's an aluminum like the 10T's, but one side is flat at a



Kyosho—the company that brought us the nitro-powered pickup—has worked long and hard on the Outlaw Rampage Pro. It's nothing like its predecessor, the

Rampage.

This all-new truck features a lightweight, yet durable, blue-anodized, semi-tub aluminum chassis, and an upper nylon and

plastic chassis stiffener helps with chassis rigidity. The Team truck has a lot of hot features: Kyosho's hard-anodized, Teflon-

coated, Ultimate shocks are their best yet, and the truck has a trick three-gear transmission

that features a low center of gravity and a low rotating mass.

The tranny comes with a standard slipper, but the truck I tested was from one of our left-coast con-



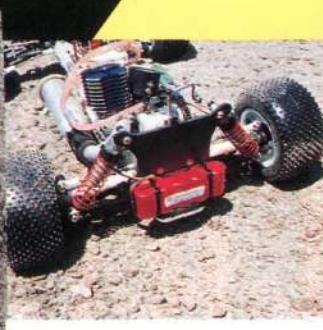
When we looked at Schumacher's first nitro truck—the Nitro 10—in the January '92 issue of *R/C Car Action*, we were impressed. It handled better and was

faster than the only other truck on the market at that time—the Kyosho Outlaw Rampage. It had decent suspension and a potent Irvine .15 engine, which doesn't quite fit into

today's racing structure. Well, that was yesterday, and the Nitro Storm 2000 is today.

The Nitro Storm 2000's design is based on that of its highly complex

electric brother, the Storm 2000. Like the RC10T and RC10GT, the Nitro Storm 2000 shares a few components with its electric counterpart—mostly in the suspension category. The Nitro Storm 2000 has long, rigid suspension arms and unique, hard-anodized, variable-



When it comes down to deciding which company actually put 1/10-scale nitro truck racing on the map, Traxxas is right up there. With the release of the Nitro Hawk

in '93, Traxxas showed that it thought this class had definite potential. Tricked-out Nitro Hawks started to show up at gas races; soon afterward, more competitive

machines, such as the RC10GT and the Outlaw Rampage Pro, not only showed up but also started to steal the wins away from the Nitro Hawk. Well, it didn't take Traxxas too long

to revamp their efforts and enter an all-new nitro truck in the combative nitro ring. Enter the Traxxas GRT....

Based roughly on Traxxas's new electric racing truck—the SRT—the GRT has the same long front and rear suspension arms and the same new, high-volume, hard-anodized, Teflon-coated Big-Bore

ASSOCIATED RC10GT

indented to accommodate the exhaust pipe. New steering bellcranks with a built-in servo-saver provide better steering response than the RC10T.

The truck is equipped with a revamped Stealth tranny, which now comes in a redesigned lower-profile case and features a ratio of 2.60:1. There's a special options kit that includes: a clutch setup; a tuned pipe; engine mounts (suitable for pull-start or non-pull-start engines); and a spe-

cial RC10GT setup-and-tuning video. Other nice touches are: a fuel tank that has an internal fuel filter; a hot disk-brake system; and a simple servo mount.

For the test session, I borrowed John Huber's GT, which was equipped with a Yokomo* RX-12 engine. I took the truck to an isolated construction site near the *R/C Car Action* office. The terrain provided me with the ultimate moguls, whoops and long

straightaways and really awesome jumps. I quickly found that driving the RC10GT is almost like driving the RC10T: it's very nimble and its suspension is excellent.

The RC10GT reacted quickly (it didn't steer as quickly as the other trucks, but that was to my liking), but it didn't get out of shape over the rough stuff. On one section of really rough, hard-packed dirt, there were tons of grooves made by a

bulldozer tread; they made two really long-stutter-bump sections, and the truck loved them! When I drove it over those sections, the suspension worked flawlessly. The disk-brake system also performed flawlessly. I categorize the RC10GT as a consistently excellent handler and a very good benchmark against which to judge the other trucks.

KYOSHO OUTLAW RAMPAGE PRO

tributors (look for an upcoming "Thrash Test"), and he had an after-market DuraTrax top shaft that allowed the tranny to be decked out with Team Losi's* Hydra Drive. OK; I'll let that one mod slide.

Anyway, the truck has a removable radio tray—nice!—and the bellcrank steering system is pretty smooth. The Team version's bellcrank steering setup comes with four ball bearings. A flip-top, quick-fill, .75cc fuel tank and a set

of rear universal joints add to an already impressive truck.

I fired up the Pro's .12 CZ-R and blipped it around the construction lot to warm it up. When the thing was running smoothly, I pegged the throttle on the straightaway to see how it would react. The Pro steered a bit more than the RC10GT, but it felt a little squirrelly to me. I don't mean that as a criticism, though. I guess I needed to get used to its point-and-shoot driving capabilities.

By the time I had run a few tanks through it, I had noticed a few things: the suspension performs admirably, and the truck handles jumps rather well. I figured that the Hydra Drive was helping it to handle the rough sections smoothly, so if this is the truck for you, I recommend this after-market item, too. Also, this is the only truck that comes with a drum brake instead of a disk-brake system. Don't let that scare you away from it though;

it's excellent.

You might want to watch out for the suspension arms, because they aren't as beefy as the other trucks'. I've been told that Kyosho has new arms for it, so that might take care of that. But the truck performed admirably, and if you're looking for a truck that has decent handling characteristics and good steering, check out the Pro.

SCHUMACHER NITRO STORM 2000

damping shocks that allow you to alter the shock's damping characteristics by changing the number of holes in the piston externally. It's a pretty cool feature. The chassis is the beefiest of the bunch; it's nearly $\frac{1}{4}$ inch thick. You don't have to worry about bending this chassis. The tranny is driven by a belt, but don't let that concern you; it's as smooth and reliable as can be. The diff action on the Nitro Storm 2000 is consistent and silky smooth.

I fired up the Dynamite .12 engine

and got ready to tear up some dirt. When it comes to the Storm 2000's performance, two features come to mind: its beefiness and its steering—with a capital "S." This truck is the king of steering; actually, it steered a little too much for me. Further testing will be primarily focused on getting it to steer less and concentrate more on the bumps.

Other than that, the truck performed admirably. The clutch hooked up quickly; it handled very well in the

rough and jumped extremely well; and as I said, it steered like a mutha! If steering is what you're after, this truck is for you.

Two things I didn't like—one minor; one maybe a little more than minor. The truck is a bit harder to work on than all the others. But if you don't mind taking your time when it's time to tear it down, you're all set. I also noticed that the shock towers—especially the rear one—flexed a little bit. I have a sneaky feeling that if

you get this truck onto its lid too hard, the shock towers could break a little too easily for my liking. Beefier shock towers, or graphite after-market units, could solve this potential problem. Overall, though, I was impressed by the truck's quality and responsive handling.

shocks. The truck's aluminum chassis is narrower and lower, and it's reinforced by an upper fiberglass stiffener that doubles as a radio tray. A three-gear transmission gets the power to a set of plastic telescopic slider shafts, which then get the rear tires kickin' up dirt.

This simple, straightforward truck is very easy to work on. For ease of maintenance, it's actually a tossup between this truck and the RC10GT. We received an early prototype unit from Traxxas, and I noticed one thing I really liked when I set up my

radio gear. The existing steering servo and its steering horn weren't properly aligned when I set up my receiver. All I had to do was flip the truck upside-down and place my Allen driver in a small hole in the bottom of the chassis to reach the screw—simple as can be! This might sound trivial, but I think that paying attention to such small details is where it's at!

When it was time to fire up the truck, I bopped the flywheel on its new CZ-Z with my Sullivan hand-starter, and the engine cranked to life

right away. Let me say this: there's a night-and-day difference between the GRT and the Nitro Hawk—even a modified Nitro Hawk. The GRT handled just as well over the rough stuff as the RC10GT, and I hadn't thought that any of the trucks so far had handled quite as well as the GT.

And this bad boy can really steer, too! The only thing I didn't like about the truck is the position of its throttle servo. It's in the fiberglass upper stiffener and is exposed underneath because the chassis doesn't go out far enough on the bottom to pro-

TRAXXAS GRT

tect it. An insider at Traxxas told me that the truck is still in its very early stages, and that will be changed before it goes into final production. I never had any problems while running it, but a major side-impact crash could have done the job.

Overall, I was impressed with the GRT; not only is it much better than the Hawk, but I think that it's also just as good as any other racing truck hitting the tracks today. So if you're a Traxxas fan, keep your eyes peeled for this racer. You won't be disappointed.

Puttin' on the Paint!

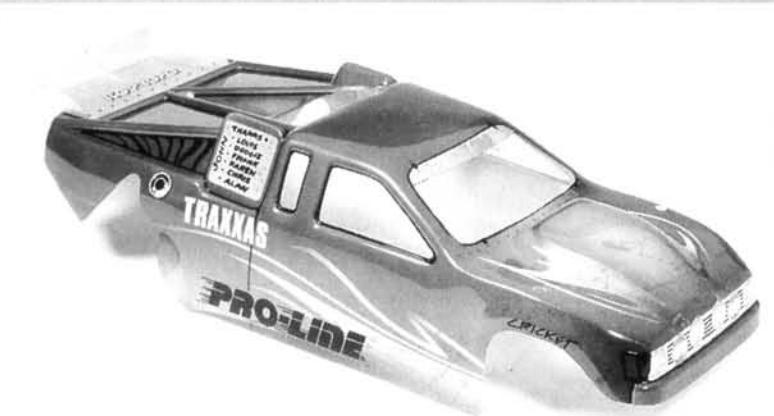
When the trucks arrived to be tested, they all lacked one thing—a cool paint job. Because we're buffoons with airbrushes, we usually send bodies out to one of our many talented painters, but we were out of time and had nowhere to turn but to ourselves. Luckily, our ace illustrator Steve Collins was here for a visit, and with a little coaxing, he was off in a flash. In one night, he painted and detailed four truck bodies—something I'd never be able to do. And the best part is that they look totally cool!

We had received a bunch of stuff from Testors* that made Steve's job a bit easier. (Actually, if it weren't for Testors, it probably would have been impossible for him to paint even one body in a night.) I never knew it, but Testors makes Pactra R/C paints. They sent one of each color in bottles and spray cans, so we had no shortage of color selections.

Steve masked the bodies with masking tape and with Pactra fine-line masking tape. The fine-line tape was easy to shape and contour to the body, even on compound curves. When the bodies had been masked, Steve began to spray. Testors sent us two types of airbrush, each one powered by a can of compressed air, and Steve found both very light and comfortable to use. They're also designed for right- and left-hand use.

Well, the bodies look wonderful, as you can see; Steve used the airbrushes to do some beautiful fades and highlights. Hey, they might even make my work look pretty good!

—John Huber



Firin' Up

Now that you have that marvelous new nitro truck staring you in the face, begging to be thrashed on, how do you "git your motor runnin'"? Is your engine equipped with a pull-starter? Obviously, if it is, that will be the easiest way to start your engine, but if it isn't, here are a few options you might want to check into:



• **Starter boxes are used by most racers.** A starter box contains a starter motor and wheel and alligator leads that clip on to a power supply—a car battery, or a 12V gel-cell. When the truck is pressed down on the top of the starter box, a switch is activated, and that engages the motor and wheel. If your flywheel is properly aligned with the starter-box wheel, your engine should start to crank over. Starter box prices range from \$75 to \$85; DuraTrax*, Dynamite* and RCMM* all produce high-quality units.

Go wi

A glow plug provides the "spark" that's necessary to bring your model's engine to life. It works somewhat like the spark plugs in your full-size car: the plug's element, usually made of a platinum alloy, is heated by the glow-plug igniter.



As the air/fuel mixture enters the engine's combustion chamber, it's compressed by the upward-traveling piston and then ignited

Fuel: What's in this Stuff?

Newcomers often overlook the importance of using the correct fuel in a model's engine. There are several key things that you should know about it, the first of which is what's in it.

All fuel consists of three major components:

- **Methanol** is the main ingredient of model engine fuel. It's a colorless, flammable liquid that's also used as an antifreeze and general solvent.

- **Nitromethane** (nitro) aids combustion because it's an oxygenator. Nitro also greatly improves throttle response (transitioning from low rpm to high rpm) and increases maximum rpm slightly. As a rule, fuel that contains 15 to 20 percent nitro is good for average use and will ensure proper idling and improved starting.

- **Oil package**—the fuel's lubricant as well as its various anti-foaming, corrosion-inhibiting and wetting (helps the oil in the fuel to attach to the engine's metal parts) agents.

In its natural state, model engine fuel is clear or slightly tan, depending on the type of oil it contains. Many manufacturers color their fuels to make them stand out from competitors', or to differentiate fuels according to their nitro content.

CASTOR OIL VS. SYNTHETIC

There are two types of oil used in fuel: castor and synthetic.

- **Castor oil** is messier and causes varnish build-up in high-heat areas of the engine, i.e., the upper piston, exhaust ports, etc. Castor, however, does provide better lubrication at higher engine temperatures and is excellent at stopping corrosion.

- **Synthetic oil** burns more cleanly than castor oil, but it vaporizes at a lower temperature. Some fuel makers add a high-tech synthetic oil that actually molecularly bonds itself to metal engine parts.

Most fuels contain a little of both types of oil: synthetic, to provide clean burning and castor for better protection at high temperatures and to inhibit corrosion.



Dynamite's Blue Thunder fuel comes in gallon and half gallon bottles. Other reputable fuels come from manufacturers like O'Donnell, Byron, and Mugen.

A FUEL RUMORS (DON'T BE FUELISH)

Much information has come down to us from the 1/8-scale, on-road, pro racing level. This élite segment of R/C racing could be compared to full-scale Formula 1 racing in one very definite way: price is no object! Most of the drivers have one of two things—a sponsor or a lot of money. If an engine lasts one or two races, the factory rebuilds or replaces it. With this in mind, it should come as no surprise to you that the fuels these racers use were designed with one thing in mind—optimum performance; not engine life. In the quest for more rpm, lubrication was cut, and some power benefits were realized. Somewhere along the line, this got turned into, "Too much lubrication, like the percentage found in airplane fuel, can hurt your engine." But there's NO WAY extra lubrication can damage your engine, or that any manufacturer can mix "over-leap protection" into his fuel. Only carefully setting the needle valve can ensure against over-leaning damage, regardless of the fuel you use. I'm sure you want your engine to last more than two or three races. (Have you checked the price of some piston/sleeve sets lately?) The modern 2-stroke multi-port (Schnuerle ported) engines can run at high rpm with fat (rich) mixtures. Take advantage of this characteristic by not going for that last 150rpm! Back the needle off a bit so there's plenty of oil and unburned fuel coming out of the exhaust. This does as much—maybe more—to carry away heat as do those nicely machined cooling fins.

STORING FUEL

Fuel readily absorbs moisture from the atmosphere, so you must always keep your fuel in a tightly sealed container. Fuel will also pull moisture out of concrete and asphalt surfaces—even through its plastic container! Try to store fuel off the floor. Also, metal containers are far better for long-term storage. Keep fuel away from direct sunlight; ultraviolet rays can have deleterious effects.

For safety and for freshness, buy only enough fuel for your immediate needs. It's probably a good idea to buy only what you need for a month's running.

—Frank Masi

*Addresses are listed alphabetically in the Index of Manufacturers on page 153.



• Hand-held wheel starter.

These units are more compact and portable than starter boxes and slightly more difficult to use (you have to bump the spinning wheel against your flywheel), but they also cost a little less. Clip the two alligator leads on to a power supply, e.g. a gel-cell, or a car battery, and you're all set to get started! You can find starter wheels by such reputable companies as Sullivan*, Hobbico*, and Pro Star* for roughly \$29.45.



• KO Propo EG Starter.

Though this isn't exactly the ideal starting system for racers, it is a pretty cool unit. Basically, the unit, which is connected to the engine, consists of an electric drive motor and a gear-reduction unit that cranks over the engine when power is supplied to the motor gear-reduction unit. Last time I looked, Tower Hobbies* was selling this starter for \$69.99.

Glow

by the hot glow-plug element. The force of the ignited fuel sends the piston back down, and then it starts the next cycle. The engine can continue to run after the glow-plug igniter has been removed because the plug's element retains enough heat from each "firing" to ignite the next one.

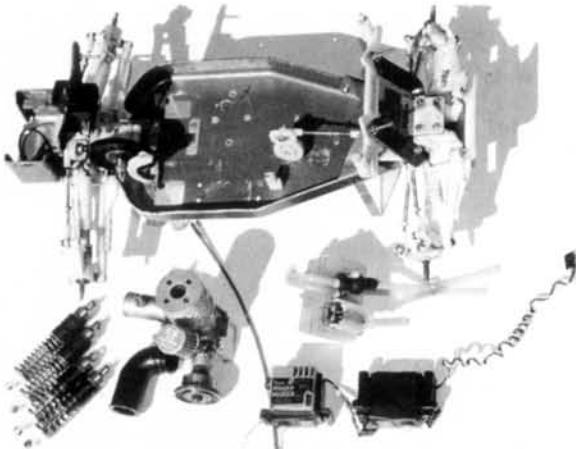
You'll often hear someone refer to glow plugs as "hot" or "hotter." Actually, they're not talking about the temperature that the plug's element reaches when it's heated, but how long the element retains heat, and that's determined by its diameter and material. Generally speaking, "hotter" plugs improve both idle and the transition from low end to high end.

—Frank Masi

HOW TO BUY A USED NITRO TRUCK

by GEORGE GONZALEZ

ARE YOU THINKING about buying a $\frac{1}{10}$ -scale, nitro-powered racing truck? Is the price of getting started getting you down? If so, buying a slightly used racing truck might be the best way for you to break into nitro power without breaking your piggy bank. Besides, a used gas-powered racing truck can sometimes be snatched up for less than half the price of a new kit, and with a little patience and some careful negotiating, you can find an R/C bargain.



Before you buy it, inspect your potential buy through and through. At this point, it's a good idea to see if any parts have to be replaced. If a lot of things have to be added and you still think that the vehicle is worth it, haggle over the price.

NITRO CHOICES

You should always be able to find good-quality used models of the most popular nitro trucks. Traxxas, Associated, Kyosho and Schumacher all make race-worthy trucks. You can also look for the highly competitive electric-to-gas conversions (RC10Ts and LX-Ts gone nitro). Become familiar with the latest models and conversions. Dig up back issues of *Car Action*, and read the track reports on the trucks you've targeted. While you're researching,

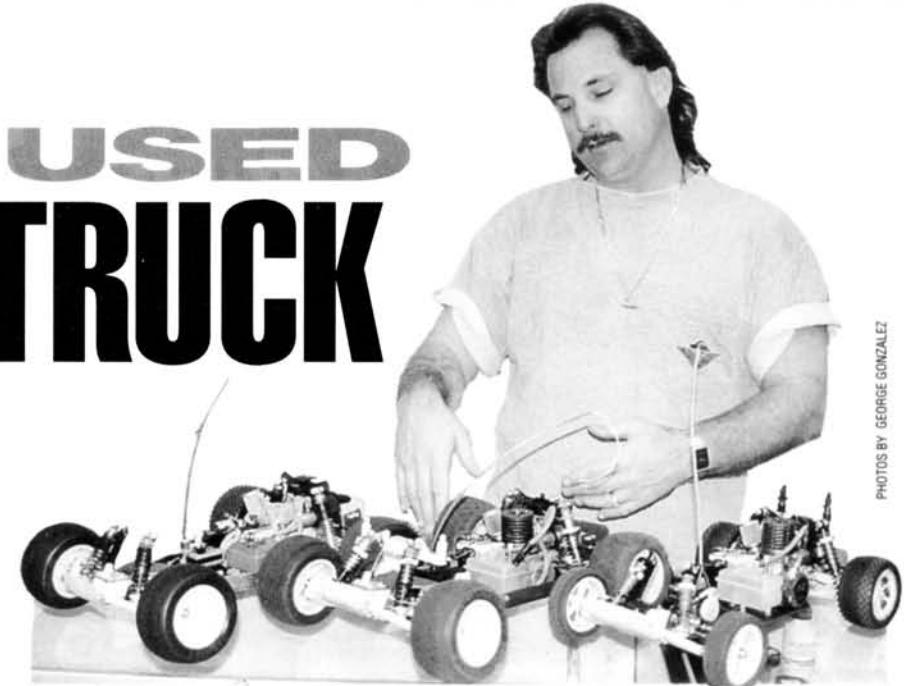


PHOTO BY GEORGE GONZALEZ

One of the best places to find a good, used nitro truck is through your hobby shop. Most have bulletin boards where people can leave descriptions of what they're selling.

Finding a Bargain

make sure that your local hobby shop regularly stocks parts for whichever truck you choose.

WHERE TO LOOK FOR BARGAINS

Many hobby shops have bulletin boards that display ads, which are often posted by regular customers. Don't be afraid to ask a store's employees about an ad; it might very well have



Also check out the carb for any dirt or signs of sloppiness. A carb is relatively easy to clean, but it's an integral part of the engine; it has to be in 100 percent working order!



It's very important to check the engine's overall condition. Completely disassemble it, and inspect the rod, piston and sleeve for signs of wear or damage. If the engine has been toasted, pass on the deal unless the owner is almost giving it away and you can figure a new engine into your budget.

been placed by one of them or by someone they know well.

Visit a track on race day, and talk to some of the drivers. Many die-hard racers have back-up trucks that they might want to trade for cash, or they might know others who have trucks for sale. Most racers take good care of their equipment, so you can be reasonably sure that the trucks

they're selling will be in good shape.

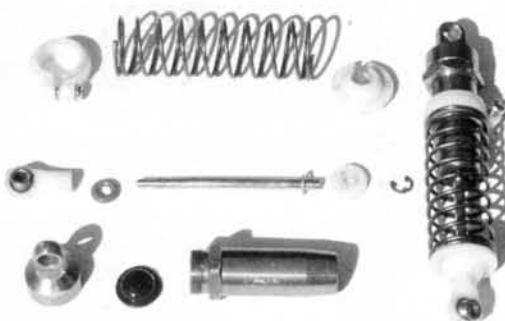
The hobby section of the classified ads offers the widest range of used cars and trucks and, with a little hunting, you can find a nitro bargain. Unfortunately, when you use the classifieds, you can't be sure how well the sellers have taken care of the merchandise.

By far, the best way to buy a used nitro truck is from someone you know and trust, such as a good friend, a member of your local racing club, or an employee of a hobby shop you visit frequently. Just remember this simple rule: you might be able to get the best price from a stranger, but sometimes, the best price isn't the best deal!

WHAT TO LOOK FOR

Before you lay down your hard-earned cash on a used gas truck, you should thoroughly inspect it. Take your toolbox, some rags, shock fluid, motor spray, fresh batteries and, if you have some radio gear, take that, too! Before you go to look at the truck, tell the seller that you'd like him or her to clean it up. (If he or she squawks, don't even consider buying it.) When you have a relatively clean truck in front of you, it's time to get dirty.

First, check the entire truck for missing, bent, or broken parts. Are the wheels and tires in good shape? How about the body?



Clean the shocks, and check for any oil leakage and bent or scored shock shafts. Check the oil inside; if it's clean, it's a safe bet that the owner maintained the shocks fairly well. If the oil is contaminated, you might want to think over the deal a little more.

Is the chassis bent or twisted? Check all the screws and bolts for signs of stripping. If you run across any loose parts, make sure that you can tighten them; stripped parts are more expensive to replace than stripped screws.

Next, check out the suspension. Remove all four shocks, and check the suspension joints for binding. If the A-arms don't operate smoothly, one or more of the

hinge pins could be bent. Check the shocks; they should operate smoothly and shouldn't leak. If any of them leak, a rubber O-ring or a plastic seal is probably torn. This isn't a big deal, but if the shocks bind when they're compressed, they could be bent or worn-out, and that is a big deal.

Remove the shock cap from one of the shocks, and drain the fluid.

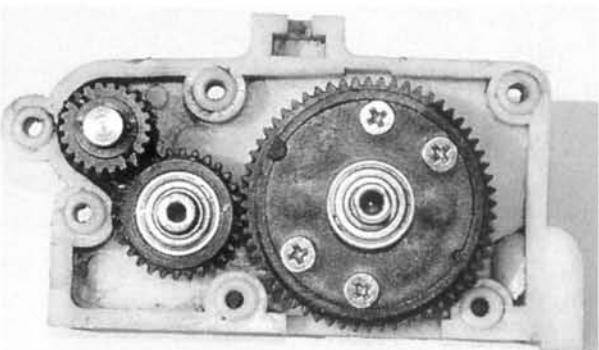
The shock oil

should be clean and clear. If the fluid pours out like molasses, this is a sign of neglect. Clean out the shock with motor spray and then fill it with new shock oil. It should operate smoothly.

Next, check the tranny. Examine the spur gear for signs of wear; the teeth should be smooth and have slightly rounded edges. Check the gear mesh between the clutch bell/pinion gear and the spur gear; there should be a slight amount of play.

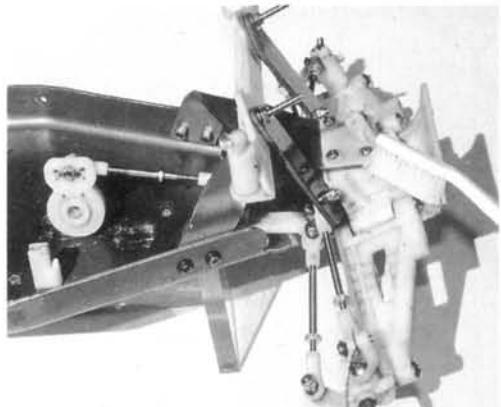
Roll the truck on the ground (with the brake disengaged). It should roll smoothly with a little resistance.

Check out the diff next. If the truck has a slipper clutch, you'll have to lock it up to test the diff properly. (Tighten the tension nut until the spring collapses.) If the truck is equipped with a gear diff, rotate one of the rear wheels. The other



Examine the tranny for excessive wear and tear and to see if it has been properly maintained. Is the diff working smoothly? Are any gear teeth missing?

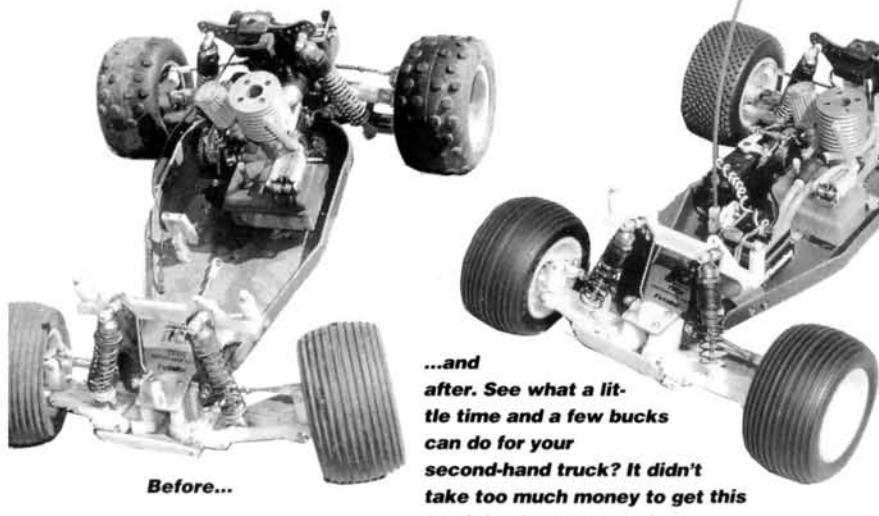
wheel should rotate smoothly in the opposite direction without any grinding sounds. If the truck is equipped with a ball diff, push down on the rear end until it bottoms out, and then try to rotate the spur



Remove the shocks, and clean the suspension arm if it needs it. The arm should move freely (without binding) throughout its entire range of travel. It should also fall under its own weight. While you're at it, check for any excessive slop or free play.

gear with your thumb; it should be almost impossible to make it slip. Rotate one of the rear wheels. The other rear wheel should rotate smoothly without feeling excessively gritty.

The last item that you should check is the engine. A visual inspection is probably all you'll be able to get away with, so give it a good once-over twice. It's best if the seller can start it up. Look for obvious signs of abuse, e.g., rust, cracks in the block, a loose carburetor, a loose exhaust manifold, missing screws, a missing needle valve, a missing low-point throttle-adjustment screw, a missing air filter, a missing glow plug, a bent or broken muffler, a broken pull-starter, or missing linkage.



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BUY A USED NITRO TRUCK



Just remember that adding parts—no matter how few—costs money. Add the cost of replacement parts into the overall deal and see how close the total comes to the price of a new truck.

Inspect the Allen-head machine screws that secure the heat-sink head to the cylinder block and those that secure the backplate to the engine block. Stripped screws in these areas could mean that you'll have to drill out the screws and retap the engine block (not a pretty picture!). Check the engine mount for signs of stripping. If a pull-starter is included, give it a few tugs to make sure it works.

Examine the clutch and bell housing. The best way to do this is to remove the spur gear and then give the clutch bell a spin. If it's in good shape, it should spin freely for several seconds. If it doesn't, the clutch pads might be broken, the bearings might be worn-out, or the crank might not be true. Also, carefully inspect the teeth for signs of wear.

Finally, check the compression. First, make sure that the glow plug is tight and that the glow-plug washer is aligned. Next, turn the flywheel with your thumb; you should feel the piston rise with a fair amount of resistance before it pops back down with authority. If the piston moves up and down with little resistance, the piston, sleeve and rod will have to be replaced.

HOW MUCH IS TOO MUCH?

Buying a used gas-powered truck can save you a lot of money, but before you buy, make sure that you won't have to replace a ton of parts; that would defeat the purpose. The going rate for an extra-clean used R/C vehicle is about half what it costs new. Useful upgrades are also worth about half their retail price. If any parts are broken or missing, deduct their full retail price from the price of the truck. Use this method when you come across what seems to be a good deal, and you won't go wrong! ■

READERS' RIDES



"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 251 Danbury Rd., Wilton, CT 06897. If the Ayatollah of Radio Control chooses your photo, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the fourth annual "Reader's Ride of the Year Contest" in the fall of 1994. Write your address and phone number on your letter and on the back of each photo you send, in case we need to contact you.

MAKE A LEFT FOR JAPAN

John Parks—a U.S. Marine who's currently stationed in Okinawa, Japan—sent us this photo of his World of Outlaws sprint car. Doug Edwards of Longmont, CO, hand-built the chassis using $\frac{1}{8}$ -inch piano wire, and a company in Colorado molded the hood and tail assembly out of Lexan. The front and rear suspension is made of Associated off-road components. Pro-Line Wide Five tires ride up front, and Losi 2.2 step-pins grab for traction in the rear. A Tekin 410K gets power from a Trinity 1700 SCRC pushed pack and then provides juice to a Yokomo 12-turn, single-wind modified motor. Other miscellaneous mods include HPI heat sinks for the motor, Tecnacraft tie rods, RPM ball cups and ball ends, and a Futaba 132H high-speed servo.



ALL-AROUND WINNER

Bill Rhodes, who hails from the sunny state of Florida (Jax, to be exact), sent us this photo of his tricked-out Team Losi LX-T. An avid racer (he hits the track six to eight times a month), he took first place in a concours event with this beauty. This truck may look pretty happenin', but it can get up and go as well; it's decked out with a Novak TIX ESC, a 1700 SCRC B&T Blister Pak and a Trinity Slot Machine II motor. A Futaba Sport radio keeps the truck on track. Congrats on your concours win, Bill; it's a real looker!

THE JAGGED EDGE

On a cloudy day in Kent, WA, Dwayne Coby took this sharp-looking photo of his equally sharp-looking Associated 10L. It's equipped with a graphite chassis, a Novak receiver and 410 M1c ESC, Associated's new front end, a titanium axle and BRP diff rings and hubs. The car is powered by a Trinity 12-turn double-wind and a Sanyo SCR 6-cell pack, and it's controlled by a Futaba Magnum Junior radio. He gave the HPI Jaguar GTP body the once-over himself. It looks sweet, Dwayne; good job.



I FIRST SAW the *Revolver* annihilate the field at the '93 ROAR Nats in the very capable hands of Joel Johnson. Since its debut almost a year ago, wannabe national champs have been taking advantage of this award-winning design, tearing up tracks around the country. Because everyone else was having such success, I decided that it was time to jump on the bandwagon.

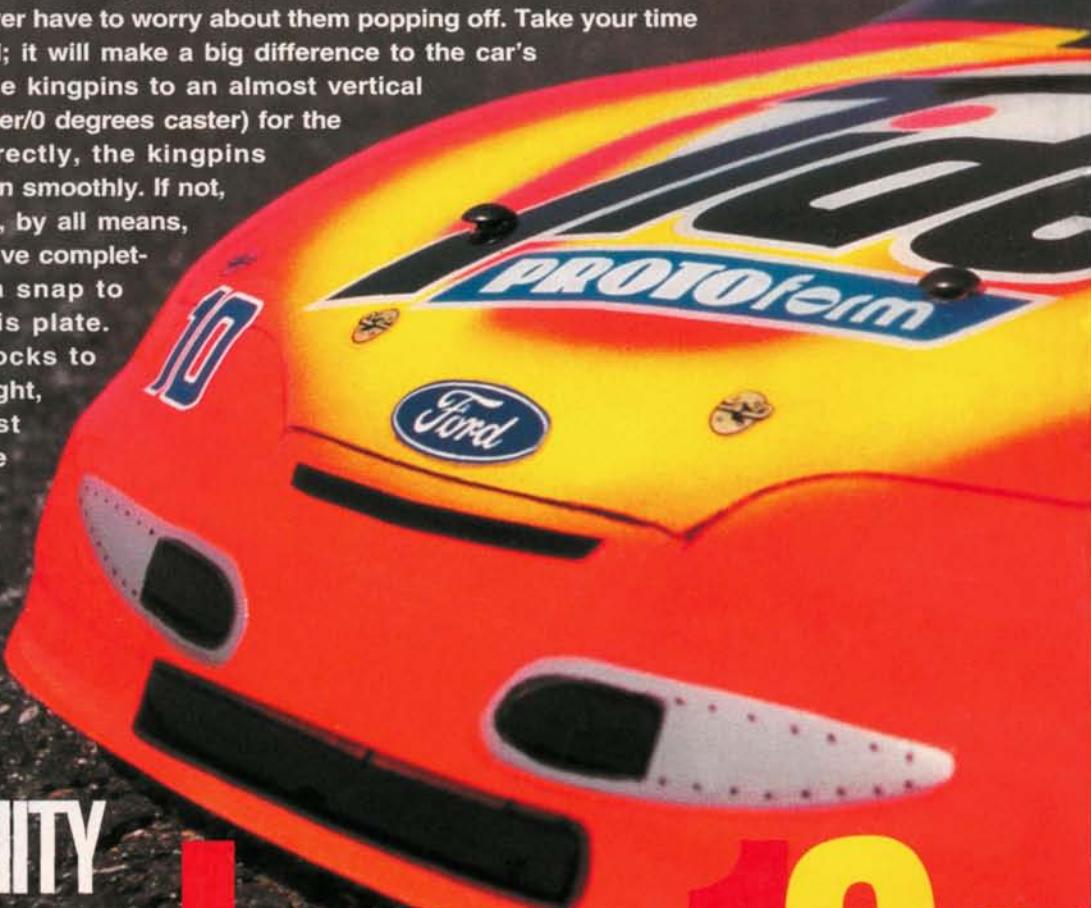
CONSTRUCTION

Trinity* does a good job with step-by-step instructions, using concise, well-written text and clear photos. Before started to build, I pulled out the chassis plate and sanded it and the other graphite components with 400-grit sandpaper. I sanded the sharp edges until they were smooth and clean. I spent a little extra time around the battery slots; I'd hate to have a sharp edge cut through the battery tape and ruin my day.

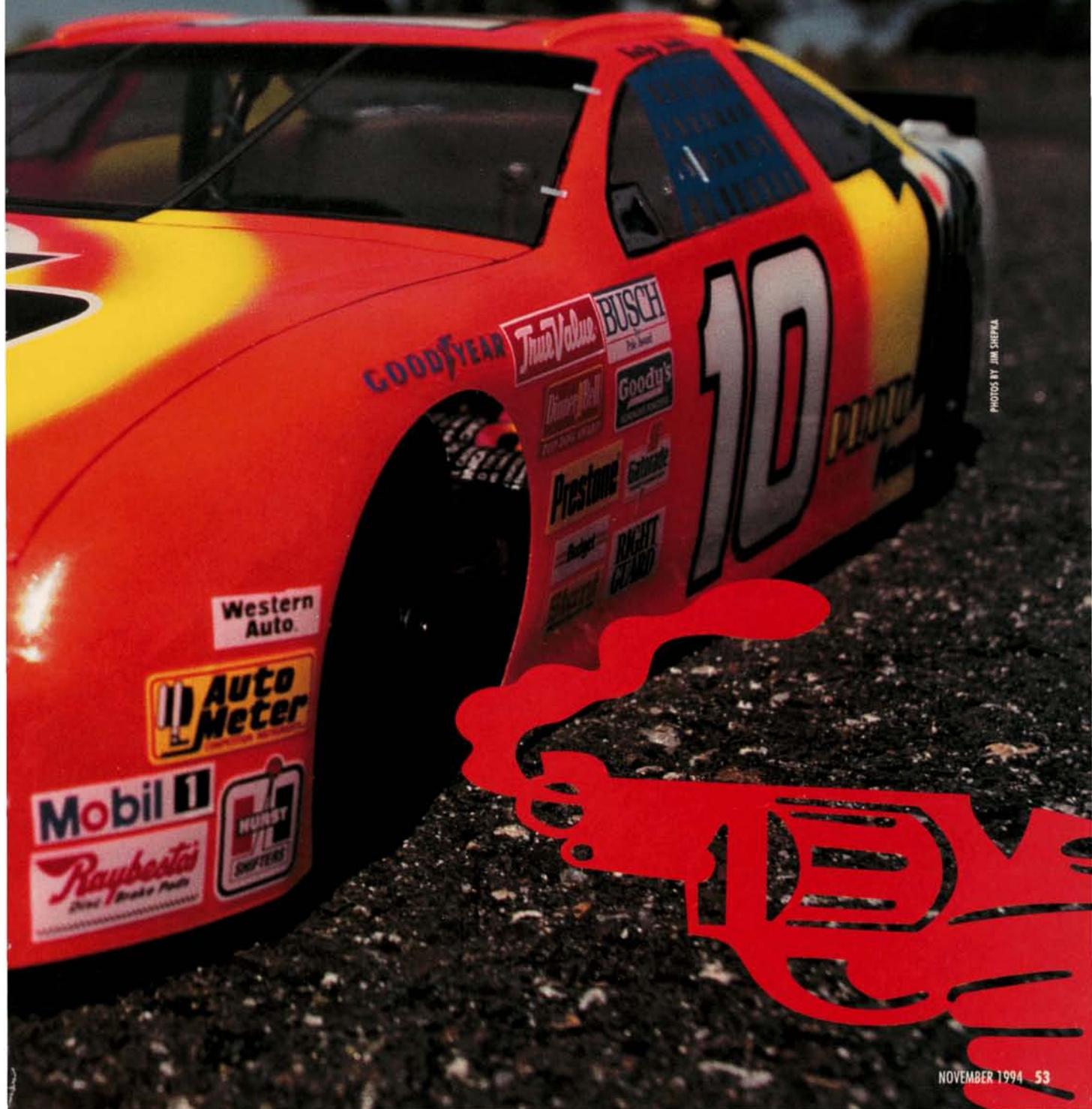
The key to this ride is a scaled-down version of the popular, but very sophisticated, EV10 Reactive Caster front end. It consists of two separate turnbuckles (for camber and caster adjustment) and a lower graphite plate. I substituted high-quality, bulletproof units from RPM* for the turnbuckles' stock rod ends. You'll never have to worry about them popping off. Take your time assembling the front end; it will make a big difference to the car's handling later. Adjust the kingpins to an almost vertical position (0 degrees camber/0 degrees caster) for the initial setup. If set correctly, the kingpins should move up and down smoothly. If not, reread steps 2 to 14 and, by all means, take your time! After you've completed the front end, it's a snap to mount it on the chassis plate. Trinity offers a few blocks to adjust the front ride height, so check what the fast guys at your track are using. They'll be able to help you pick the right ones.

by JIM SHEPKA

TRINITY
Revolver 12s

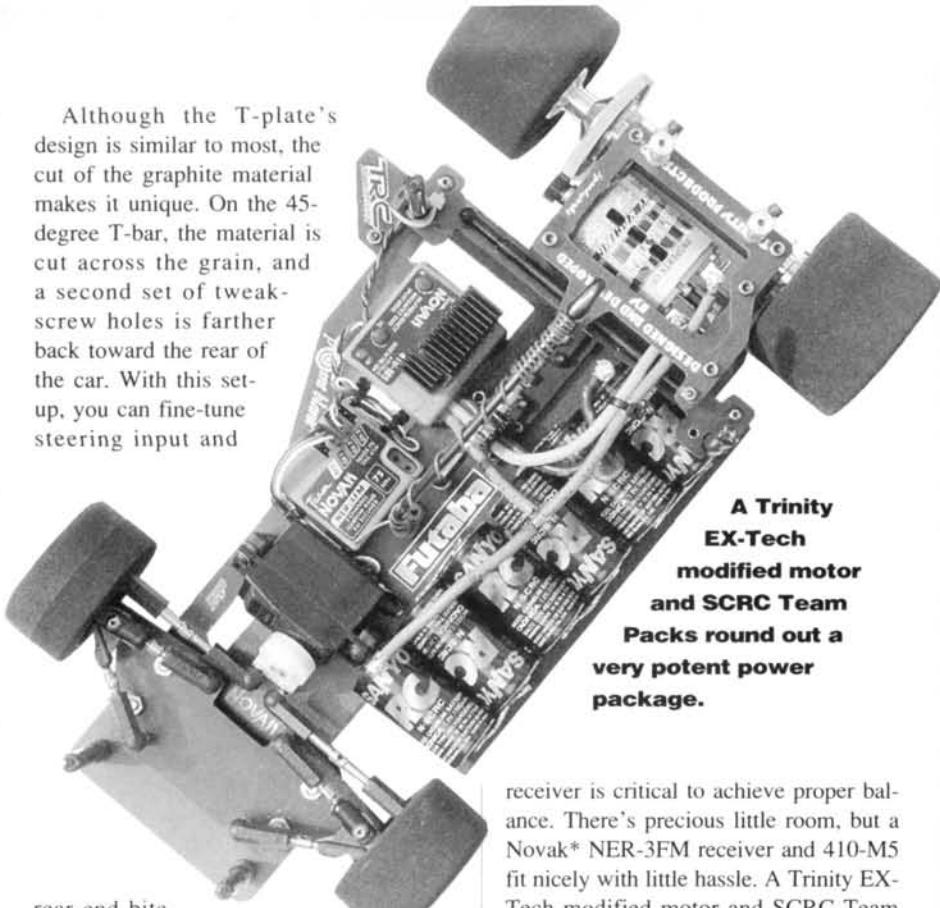


Obliterator!



PHOTOS BY JIM SHERNA

Although the T-plate's design is similar to most, the cut of the graphite material makes it unique. On the 45-degree T-bar, the material is cut across the grain, and a second set of tweak-screw holes is farther back toward the rear of the car. With this setup, you can fine-tune steering input and

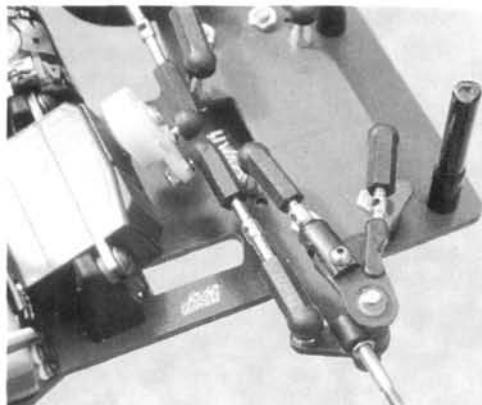


rear-end bite as needed. Of course, if you want to keep things simple, Trinity also offers a standard T-plate.

One other major difference in the Revolver's design is the use of a damper tube that runs from the top chassis brace to the upper axle-block brace. The damper tube controls the side-to-side damping and is similar to those found on Bolink* cars. Heavy silicone goo is used in the damper tube.

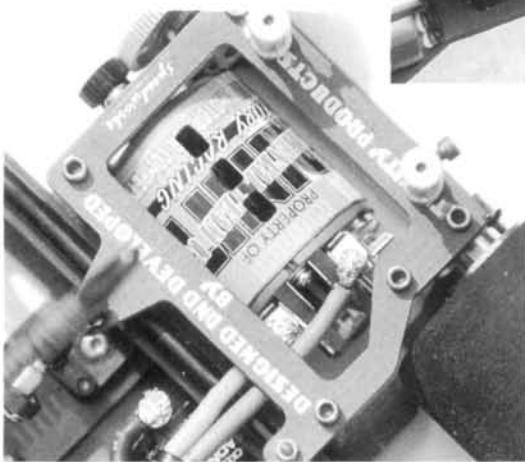
With the basics complete, it's time to mount the electronics package and the power supply. The placement of the ESC and the

receiver is critical to achieve proper balance. There's precious little room, but a Novak* NER-3FM receiver and 410-M5 fit nicely with little hassle. A Trinity EX-Tech modified motor and SCRC Team Packs round out a very potent power package. I made a quick call to Protoform* and soon had one of their incredibly detailed $\frac{1}{12}$ -scale Ford Thunderbirds, complete with add-on



Trinity's Reactive Caster front end is one of the most sophisticated front ends ever built. I replaced the stock plastic ball ends with heavy duty ones made by RPM.

spoiler and roof/trunk rails. Brian Chudy took Proto-form's latest effort to the next level with an awesome paint scheme. Check this out; it was painted entirely on the inside! Give him a call at (905) 684-5831; he'll be



The Trinity Ex-Tech 13-turn, triple-wind motor provided ample power for the Stafford Springs track.

TRINITY 12SS

Scale $\frac{1}{12}$
List price \$275

DIMENSIONS

Overall length 11.75 in.
Wheelbase875 in.
Front width650 in.
Rear width650 in.

WEIGHT

Gross (ready to run) 1 lb., 7 oz.

CHASSIS

Type Pan
Material Graphite

DRIVE TRAIN

Type Direct drive
Primary Pinion/spur
Transmission n/a
Differential(s) Ball
Slipper clutch n/a
Bearings/bushings Bearings

SUSPENSION

Front: Type Reactive Caster
Damping None
Rear: Type T-plate Delta shock, lateral damper
Damping Delta shock, lateral damper tube

WHEELS

Front: Type TRC ZR-1
Dimensions (DxW) 1.4x0.965
Rear: Type TRC ZR-1
Dimensions (DxW) 1.40x1.50

TIRES

Front TRC Green Dot
Rear TRC Green Dot

ELECTRICS

Motor, battery, ESC Not included

OPTIONS TESTED: Futaba 132H servo; Kimbrough* servo-saver; Novak* NER-3FM receiver; 410-M5 ESC; Trinity* SCRC Team Pack; Robinson* Silencer pinion; Protoform T-Bird body.

HITS

- Easy to build
- Very fast
- Good instructions

MISSES

- Some parts had to be trimmed

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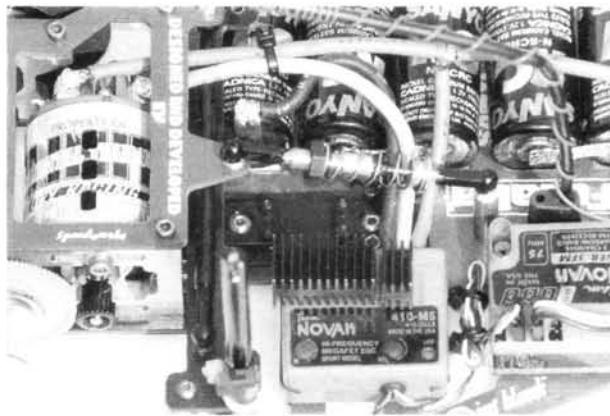
TRINITY 12SS

happy to work with you. I sure hated to run it during the test session, but what the heck; that's racing!

ROAD TEST

One of the advantages of testing a new car at K&N Speedway in Connecticut is that somebody there is probably racing one! Visiting the most competitive carpet track in the country does have its advantages. Well, to no one's surprise, a number of guys there were well on their way to the next level. Now, they didn't share all their secrets, but it doesn't take long to get up to speed with the Revolver. Nothing beats a lot of laps, and for sure, I put a lot on that day and in the weeks that followed.

Now that I've had a couple of weeks to dial in the Revolver, I'm quite impressed by a couple of things. At first, I was also a little overwhelmed with all the fine adjust-



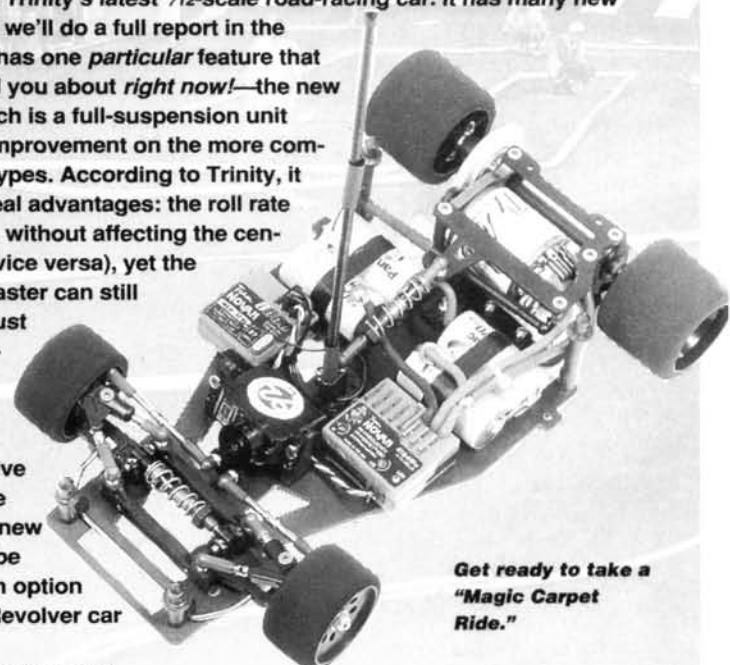
The tiny Delta-type shock handles the front-to-back damping. A lateral damper tube controls side-to-side movement.

ments required to figure out the front. But as with anything, the more familiar you become with it, the easier it is to figure out. Lap times are down, speeds are up, and my enthusiasm for $\frac{1}{12}$ -scale racing has returned. I find that all to my liking.

*Addresses are listed alphabetically in the Index of Manufacturers on page 153.

The Revolver Reloads

Since Jim wrote this article, current events have given rise to a new car that we thought you'd like to know about. It's called the "Magic Carpet Ride," and it's Trinity's latest $\frac{1}{12}$ -scale road-racing car. It has many new features—and we'll do a full report in the future—but it has one particular feature that we have to tell you about right now!—the new front end, which is a full-suspension unit that's a vast improvement on the more common kingpin types. According to Trinity, it offers some real advantages: the roll rate can be altered without affecting the center spring (or vice versa), yet the camber and caster can still be adjusted (just like more conventional on-road kingpin front ends)—plus the reactive camber can be dialed in. The new front end will be available as an option for the older Revolver car for \$29.95.



Get ready to take a "Magic Carpet Ride."

This new 4-cell carpet machine will include a purple motor pod, hubs, hardware and a lightened graphite chassis.

TOTALLY SOLAR!

IT'S OLD NEWS. Solar energy has had a tremendous effect on mankind, whether it's heating modern officebuildings or turning tourists bright pink. There have been interesting R/C solar rollers that have taken advantage of this free energy, but the 1/10-scale Tamiya® Solar Eagle is the first to be purely solar powered. By "pure," I mean that the Eagle doesn't use any onboard Ni-Cd storage cells between the photoelectric solar cells and the electronic speed controller. The onboard systems are powered solely by the photoelectric cells, making it a totally solar system. At a ready-to-roll weight of 19.98 ounces, Tamiya's Eagle is definitely the fastest, most efficient R/C solar car that's commercially available.



by Chris Chianelli

Tamiya
EAGLE
SRC-6000

WHAT IT IS

The Eagle is a uni-body design; sort of. It's basically made of upper and lower polycarbonate body shells, and all drive, suspension and electronic components are bolted onto the upper shell. The lower shell, while providing some added rigidity, is attached with

Velcro*-brand fastener to the inner surface of the upper shell and serves mainly as a dust cover through which the front wheels and the single, rear drive wheel protrude.

The preponderance of the car's rigidity is provided by the three solar panels that are bolted onto the upper body shell. Each panel has 10 cells and generates 2.5 volts in direct

The receiver/electronic speed controller (CPR) unit, the steering servo, the plugs and the switch harness come wired and can fit in your palm. No soldering is required anywhere in this kit.

sunlight. The total 7.5 volts (800mA) are fed into the electronic speed controller via a bank of three pass capacitors; these not only act as a voltage regulator but also supply sufficient current to pull the car through a shaded area back into the energizing sunlight.

A level meter is mounted behind the cockpit area so that the capacitor status can be monitored at all times. When the capacita-

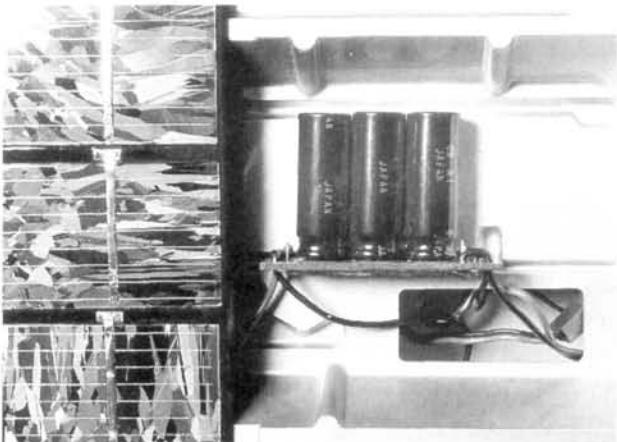
tors are fully activated, the meter's needle will move out of the red and into the silver zone. For cloudy days, an auxiliary battery case holding four AA cells can be held in place with rubber bands. The Eagle has no suspension travel and is only intended to run on smooth, relatively clean surfaces. The adjustable toe-in steering is similar to the spindle/kingpin systems that are used with on-road cars, but it doesn't have the coil spring. The single rear wheel is directly driven by a 270-size Mabuchi motor.

THE RADIO

The Solar Eagle comes with one of Tamiya's Tamtech 202 pistol-grip radios. The onboard electronics include a CPR unit. No, the Eagle doesn't have onboard cardiopulmonary resuscitation equipment. The CPR unit is an integrated, micro speed controller with a changeable frequency crystal and motor neutral adjustment. Other onboard electronics include a microservo and an on/off switch that's accessed through a small rectangular hole in the lower dust pan. The comfortable transmitter has steering and throttle trim.

ASSEMBLY

Well, there's not much to talk about here. Tamiya engineering has worked its magic

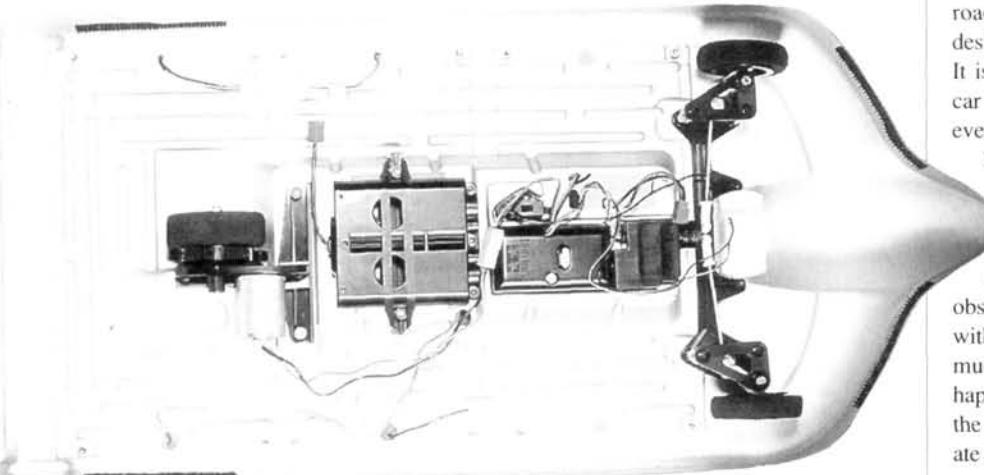


No, these aren't Ni-Cd batteries; they're pass capacitors that act as a voltage regulator. A meter that's at the rear of the cockpit shows the level of pass-capacitor activation. The unit is under the forward solar panel.

yet again. The Eagle is a fairly simple car with a low parts count, but it's still admirable that construction is completed in a mere 19 steps. In the Tamiya tradition, the instructions are a study in detail, clarity and logical progression. The upper body shell comes painted, and adding the stick-on decals provides the results you see here. One word of caution: the solar panels are very expensive and very fragile; be careful when you handle them. Never bend or drop the panels, or they may break.

PERFORMANCE?

The Tamiya Solar Eagle SRC-6000 has tremendous record-breaking potential as a superspeedway contender...on Mercury. For those of us who are still racing on the third planet from the sun, however, don't expect anything close to typical $\frac{1}{10}$ -scale on-road performance. Obviously, the Eagle's design isn't that of the typical $\frac{1}{10}$ -scale car. It is, nonetheless, the fastest solar-powered car that any of us here at *Car Action* have ever run. How fast? It can run about 10 to 12mph on a smooth asphalt surface, depending on the cloud cover and the angle of incoming sun radiation. With its narrow foam tires, proportional reverse and good turning radius, timed obstacle-course and parallel-parking events with one or a half dozen Eagles would yield much fun in the sun. After all, aren't fun, happiness and harmony some of the reasons the Egyptian sun god Ra continues to radiate affection down on the mortal world?



The bottom view of the Eagle with the polycarbonate belly pan removed. At the center, the AA dry-cell battery box is held in place with rubber bands. The dry cells are needed only if you want to run the Eagle on really overcast days; you can quickly remove the battery box when you run the Eagle in bright sunshine. At left is a single rear wheel that's directly driven by a Mabuchi 270 motor.

*The addresses are listed alphabetically in the Index of Manufacturers on page 153.



Suspension tech section

AMONG THE most important parts of an off-road racing car are its shocks. They not only absorb all the bumps and jumps that these vehicles encounter, but they also help with overall handling. If the shocks leak and are low on—or out of—oil, handling can really suffer. But by cleaning

Pro driver tips

Shock Rebuilding

by JACK JOHNSON

them periodically and doing a little preventive maintenance, you can avoid having to rebuild them for quite some time.

Sooner or later, however, you will have to rebuild your shocks. When that time comes, follow these pointers, and—I hope!—the job will be quick and simple.

KEEP 'EM CLEAN!

To prolong their life, the best thing that you can possibly do for your shocks is to keep them clean. Prevent dirt from building up around the shock shaft, or it will get into the O-ring and may scratch or even tear it. When dirt is between the shaft and the O-ring, the damage has been done. After that, no matter how much you clean the shocks, they'll continue to leak. So, obviously, the trick is to keep them clean all the time to prevent the dirt from getting in.

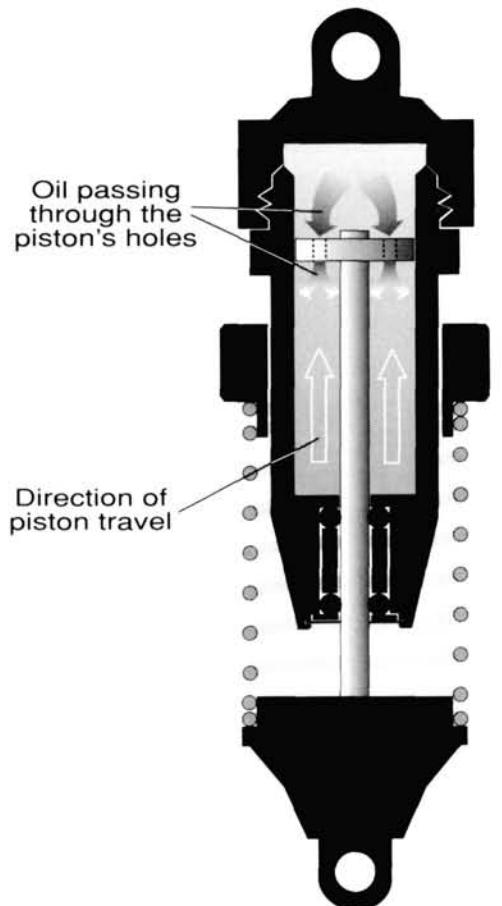
The best way to do this is with an old toothbrush. After running your car or truck, use the toothbrush to clean around the bottom of the shock where the shaft enters the shock body. This is especially important

if the track is really sandy and there's a lot of loose dirt. You could also protect your shocks with "boots"—shock covers that keep dirt out. (You can use balloons as shock boots.) When using boots, take care to ensure that they don't interfere with the shocks' movement and make them bind. Smooth shock operation is very important!

MAKE THEM LIKE NEW

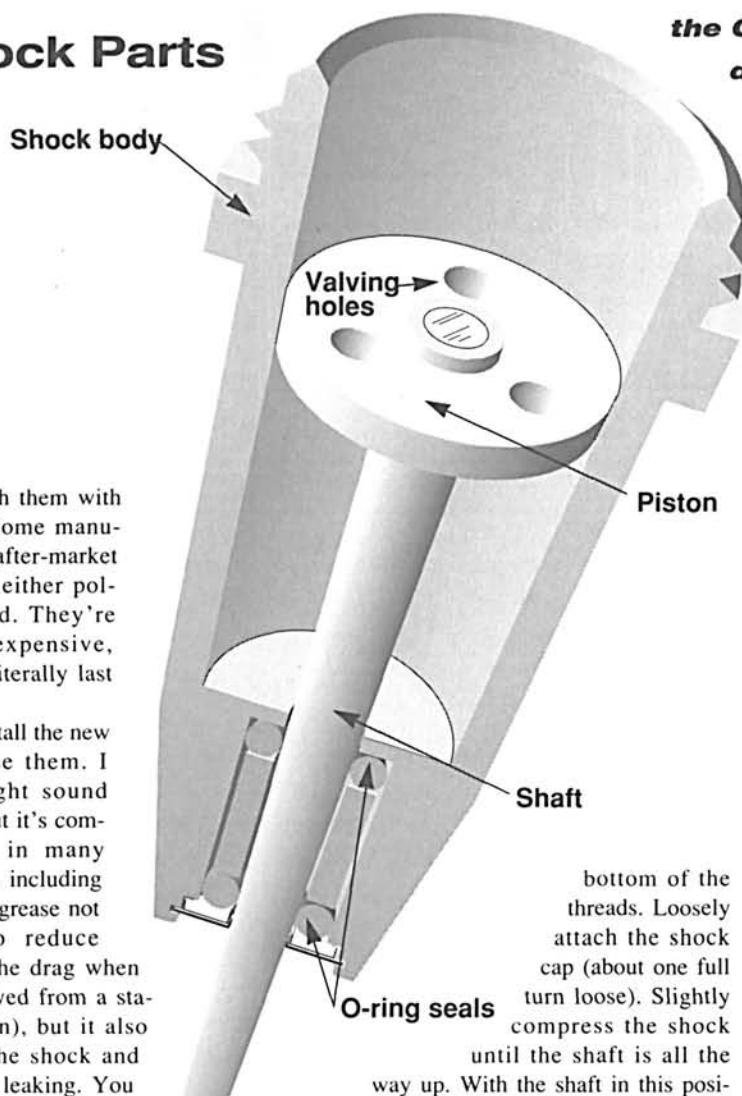
When it's time to rebuild those shocks, don't sweat it! It's very easy to do, and if you do it correctly, your shocks will last longer than ever.

- First, remove the shocks and clean their outsides thoroughly before you start to take them apart.
- Take off the cap, or cartridge, and dump out all the shock fluid.
- If you have a Losi-type shock, take the piston off so that you can remove the old cartridge and throw it away. If you have an Associated-type shock, take the piston off and remove the shock shaft from the body. Using the tip of the shock shaft, push out the plastic washer from the inside of the shock body, and remove all the O-rings and washers.
- Clean the inside of the shock body to remove any remaining shock fluid. Motor spray works well for this. Be sure to dry the inside of the shock body thoroughly before you continue.
- Next, inspect the shock shafts. Check their surfaces for scratches and nicks. If they're only slightly



**Shock under
Compression**

Shock Parts



When dirt is between the shaft and the O-ring, the damage has been done. After that, no matter how much you clean the shocks, they'll continue to leak. So, obviously, the trick is to keep them clean all the time to prevent the dirt from getting in.

scratched, polish them with crocus cloth. Some manufacturers offer after-market shafts that are either polished or coated. They're a little more expensive, but some will literally last forever.

• Before you install the new O-rings, grease them. I know this might sound funny to you, but it's common practice in many forms of racing, including motocross. The grease not only helps to reduce "breakaway" (the drag when the shaft is moved from a stationary position), but it also helps to seal the shock and prevent it from leaking. You can use a few types of grease for this. Check with a high-performance motorcycle shop for fork-seal grease, or do what I do: use RCPS* Green Slime grease. It was specially designed for this purpose, and it has worked well for me for a number of years.

ASSOCIATED-TYPE SHOCKS

For Associated-type shocks, build the O-ring assembly in the bottom of the shock body as you usually do. Apply grease liberally to both O-rings and to the inside of the large spacer that goes between them. When you've snapped the large washer back into place, insert the shock shaft *slowly* through the bottom of the shock body. Be very careful not to tear the new O-rings.

Wipe any excess grease off the shaft, install the piston, then fill the shock with shock fluid up to where the threads start. Slowly work the shock piston up and down in the shock to allow the fluid to pass the piston, and again fill the shock to the

bottom of the threads. Loosely attach the shock cap (about one full turn loose). Slightly compress the shock until the shaft is all the way up. With the shaft in this position, slowly tighten the cap all the way down. As you do this, fluid should bleed out from the top of the shock.

If the shock has been bled properly, when you pull the shaft all the way out, it should move back in slightly on its own, and when you compress the shaft all the way, it should come back out slightly. If the shaft will not go all the way into the shock, there's too much shock fluid. Loosen the cap and bleed fluid out until the shock operates as already described. If you can feel that there's too much air in the shock (you'll hear a "squishy" sound), remove the cap and add more fluid.

LOSI-TYPE SHOCKS

For Losi-type shocks, grease the new O-rings before you install them in the cartridge. If your cartridge was pre-assembled, pry the cap off carefully (be extra careful, because you'll use this cap again). Liberally grease both O-rings and the inside of the center spacer, then assemble the cartridge as you usually would. *Slowly*

slide the new cartridge over the shaft, and be careful not to tear the O-rings as you do so.

Wipe excess grease off the shaft and attach the piston. Fill the shock body with shock fluid up to where the threads start. With the cartridge against the piston, carefully thread it into the shock body, but leave it about one full turn loose. Slowly compress the shock (cartridge-side up) until the shaft is all the way in. With the shock in this position, tighten the cartridge all the way. As you do so, fluid will bleed out of the shock. Make sure that the cartridge is tight!

If the shock has been bled properly, when you pull the shaft all the way out, it should move back in slightly on its own, and when you compress it all the way, it should come back out slightly.

If the shaft won't go all the way into the shock, there's too much fluid in it. Loosen the cartridge and bleed fluid out until the shock operates as described above. If you feel too much air in the shock, remove the cartridge and add more fluid.

That's really all there is to it. Follow my advice and your shocks will work well and predictably. They'll never shock you! ■



suspension
tech section

Getting out of a bind

Smoothen Suspension

by DOUG MERTES

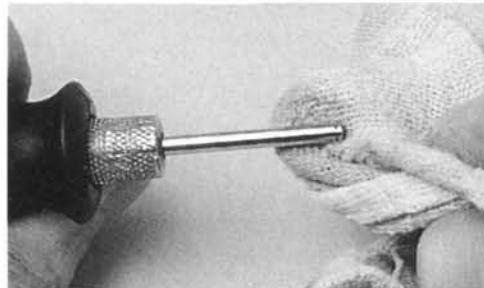
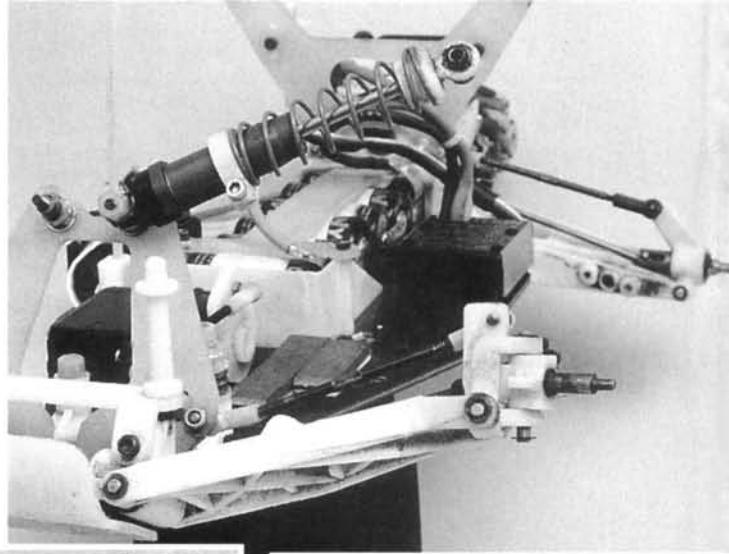
PICTURE THIS: two buddies are running their R/C cars in an open field where they've set up a racetrack. The cars are virtually identical and, because both drivers ordered their first R/C kits at the same time, neither is a more experienced driver. Yet one car glides effortlessly over bumps and lands gracefully after long jumps while the other seems to fight its way through turns and seems generally unhappy. What could cause such a major difference in handling?

Sure, one guy could just have better natural driving skills, or maybe the slower racer is just having a bad day. It's far more likely, however, that the driver of the smoother-running car made an effort to ensure that his car's suspension would work as well as its designers intended.

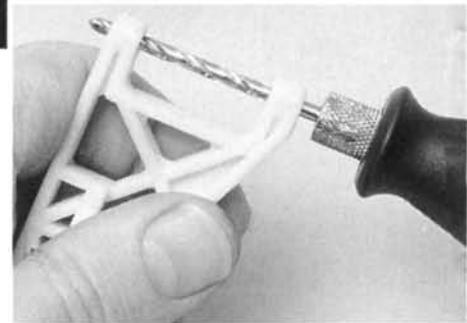
Your car's suspension is supposed to keep the wheels in contact with the ground as much as possible. Today's car and truck manufacturers encourage you to change spring rates, oil viscosity and geometry settings to optimize the vehicle's response to the surface on which it runs. The only way to be certain that you'll get the most out of all that fine-tuning, however, is to minimize friction, in the car's arms, carriers and bulkheads, without introducing unwanted slop or clearance.

You'll know that your car or truck has reached its maximum smoothness potential when the suspension falls and flops under its own weight before the shocks and wheels are attached, yet has minimal side play at the critical hinge-pin joints. Most new kits won't do that right out of the box. Follow along as I show you how to make your car's suspension really smooth!

1 Don't subscribe to the old "slap it together and it will loosen up with age" school of thought. This RC10T has so much side-to-side slop in the suspension that it needs a total rebuild, but look at what happens when the suspension is fully compressed. This is exactly the opposite of what you want to happen! The suspension should fall under its own weight with no binding.



2 Start by polishing the hinge pins and kingpins. If you decide to reuse old pins, make sure that they're not bent by rolling them across a flat surface, such as a pane of glass. Place each one in a drill and, using a good-quality metal polish and a soft, clean rag, polish one end, then the other. This will remove any burrs that remain from the machining process and keep the pin surface nice and smooth. Ball ends and nylon cups can get sticky, too. Polish the balls in the same way as you did the hinge pins.



3 Typically, a hinge pin is press-fit into one part, such as an arm mount, while the arm itself is allowed to pivot freely on the pin because it fits the pin more loosely than the arm mount. The pin itself seldom rotates. To ensure that the path for the pin in the pivoting part is of the correct size, run a drill bit that's the same size as the hinge pin through it (use a micrometer or a caliper to measure if you're unsure). In this case (an RC10T), it's an $\frac{1}{8}$ -inch bit.

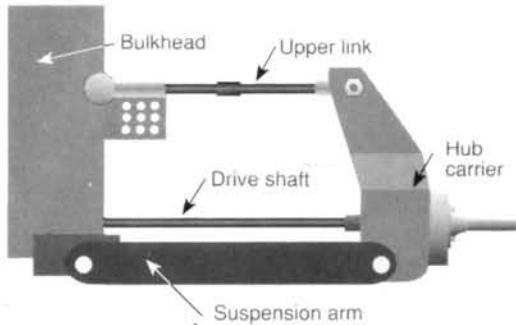
(Continued on page 68)

Those tricky camber links

Remember when your math teacher told you that you'd be able to use the math you learned in real life?—and how you thought that was total bunk? Wrong-o, pal! Pull out that old geometry book for a quick lesson in chassis setup!

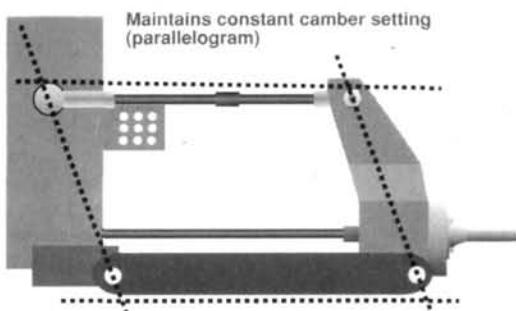
Typical off-road suspension design

Modern front and rear suspension systems typically consist of a lower, fixed arm and an upper, adjustable link. In addition to changing the length, you can usually change the anchor points at one or both ends of the upper link. Wheel-camber variance should be set through geometry; use the upper-link turnbuckle to make fine camber adjustments only after you've decided how you want the wheel to react through its travel.



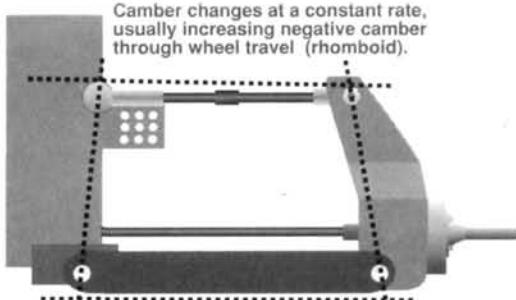
Setting for constant camber

When the upper link and lower arm are of the same length and the lower hinge-pin to ball-joint heights are identical on both ends of the arm, the wheel remains at its static camber setting throughout its range of travel. Your math teacher called this a parallelogram. This setting is used for consistent, fluffy, high-bit tracks. The tire's vertical aspect moves with the chassis roll; the more the car leans, the more the tire leans in the same direction.



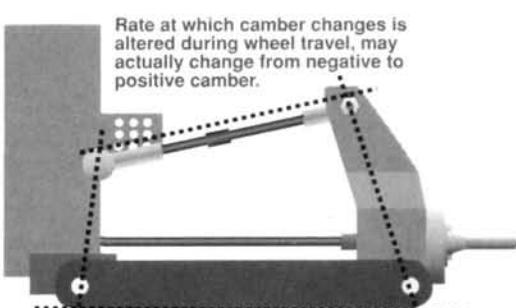
Increasing camber

When you shorten the upper link and keep the hinge-pin heights the same, the wheel's camber increases at a constant rate during wheel travel. Usually, negative camber increases, i.e., the wheel leans inward more as the suspension is compressed. This is the setting you'd usually use on a low-bit or hard-surface track. No matter how much the chassis rolls, the wheel stays relatively vertical to the track's surface. Use this setup on carpeted indoor stadium tracks; it reduces uneven foam-tire wear.



Positive-to-negative camber

When you change the hinge-pin to anchor-point height at one end, the rate at which camber changes is altered. Shortening the height on the chassis side usually increases the rate of negative-camber change during wheel travel. Some combinations result in truly bizarre vertical aspect changes during travel, such as going from negative to positive camber, but they may work well on certain tracks with varied terrain. Experiment with your car's suspension so that you know what effects these changes will have.



Static ride height is important, too. Drop your fully loaded car or truck 6 or 8 inches onto a flat surface. The rear axles should be level with the surface, and the front arms should be slightly raised. Once again, experiment with these settings so you can fully appreciate their capability to alter the way in which your car reacts to the track.

A final note of caution: make only one change or adjust-

ment at a time! If you make many adjustments at once, it's easy to get confused about the actual effect a suspension-geometry change has on your vehicle's handling. You should also keep a small notebook and a pencil at hand when you experiment with your car's setup. That way, you can always go back to the setting you want if your car's handling gets a little strange.

Team Losi

TECH TALK

DOUBLE-XT WINS BIG!

The Double-XT was very impressive in its first outing. The 1994 NORRCA Nationals was the first time that the Team Losi racing team competed with these new trucks. Brian Kinwald and Jack Johnson qualified third and fourth respectively. Not bad, considering that the first time that they drove these trucks was at the race! Brian went on to eventually win two of the three legs of the main event.

In the Double-XT's very next race—the Canadian Nationals—Jack Johnson and Scott Brown had the only two Double-XTs at the event. Jack TQ'd and won, and Scott qualified and finished second. The Double-XT should be available by the time you read this column.

SHORT CHASSIS HANDLING

If you've tried a short chassis on your Double-X car, you might have noticed that it handles a little weird. This happens because the shorter chassis puts a higher percentage of the weight on the rear end of the car and a smaller percentage on the front. An easy fix for this is to remove the front bumper and place $\frac{1}{4}$ to $\frac{1}{2}$ ounce of weight in the bottom of the front bulkhead. The bumper, when replaced, will hold the weight in place. Most of the team racers use weight in the bulkhead when running a short chassis, and they remove it if they're running a standard chassis.

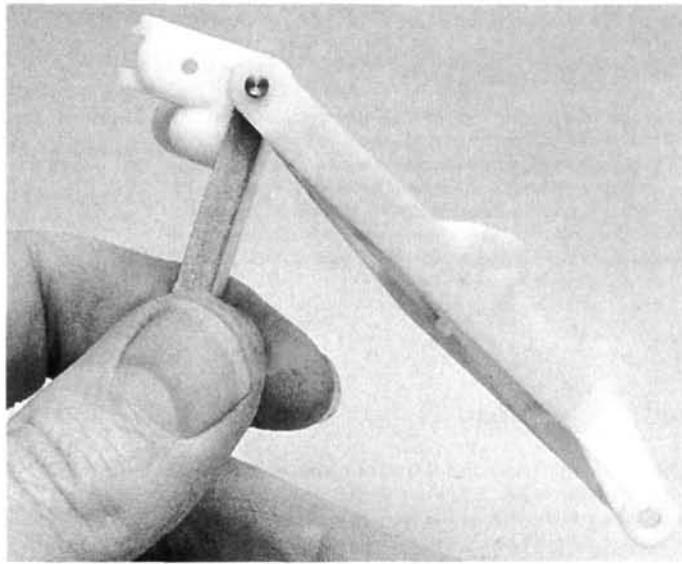
WIDE BODIES

By now, you may have seen some of the team drivers cutting their front wheels to make the front tire wider. Before you attempt this and slip, gouging your finger, be patient. Team Losi now has a wider tire available that mounts on a standard wheel. In our testing, we have found this tire to actually work better than the "stretched" standard tires. These new tires are called "Wide Bodies" and they're available in both Gold and H.T. compounds. The part numbers are A-7202 (H.T.) and A-7202G (Gold).

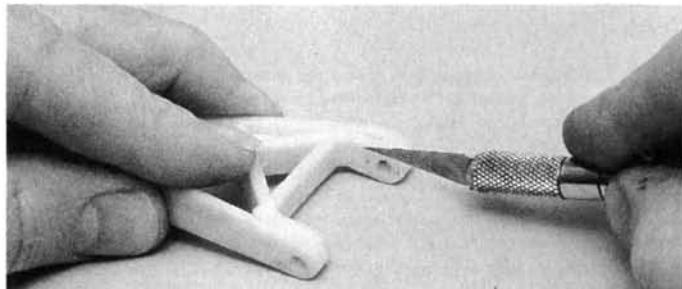
* * *

Let us know what's going on! Address your questions and problems to Team Losi, "Tech Talk," 13848 Magnolia Ave., Dept. J, Chino, CA 91710.

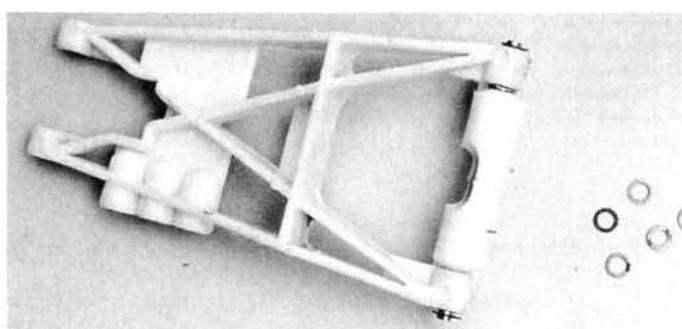
SMOOTHER SUSPENSION



4 *This is the way it's supposed to go together! The arm falls under its own weight without any binding. Put the whole suspension system together this way, and your car's ride will be as smooth as glass—no matter what the terrain. You'll be in total control!*



5 *Frequently, binding occurs where the arm and the bulkhead intersect; this can cause the suspension to be sticky. Using sandpaper or an X-Acto knife, remove some of arm's surface a little at a time until the fit is perfect. Be careful; those blades are sharp!*



6 *If you remove too much material or if there's a gap where the suspension parts meet, use a thin washer of the appropriate inner diameter, such as an $\frac{1}{8}$ -inch motor spacer, to take up the slack. Once again, make the fit just right.*

How to choose 'em and use 'em

Spring & piston selection

by JACK JOHNSON

SHOCK absorbers, i.e., springs, pistons and fluid, have a big impact on an R/C off-road vehicle's performance. If your shocks are set properly, your car will be dialed; if they're set incorrectly, you'll be out to lunch. There are an infinite number of adjustments that can be made to the shocks by combining changes to the spring, the piston and fluid viscosity, but it's less complicated than you think. Don't be intimidated; read on.

SPRING INTO ACTION

There are more springs available for today's shocks than you'll probably ever use. They range from extremely soft to excessively stiff. The truth is that once you've found a spring that works well, you'll probably need only two more pairs—a slightly stiffer pair and a slightly softer pair.

Springs are measured in a number of ways. Some manufacturers refer to their springs as soft, medium, or firm; others label them by spring rate (usually in pounds). Unless you have an accurate method of comparing one type of spring with another, I suggest that you stick

with one type, e.g., Associated*, Losi* or Schumacher*. The best place to start is with the springs that come with your car or truck. Manufacturers spend hours testing these cars to get them to perform at their best. Therefore, the stock springs are probably very close to the ideal spring.

It's hard to give a general rule of when to use what spring, because of all the variables involved with different track conditions. Here's a rule of thumb: if the track is very thick or soft, use a softer spring; if the track has high bite, use a stiffer spring to control chassis roll. On slick tracks, a soft spring will allow the chassis to roll more, and this will increase traction. On high-traction surfaces, a stiff spring will keep the chassis from rolling too much, and this will help prevent traction rolls.

You can't make a spring stiffer by adjusting the spring collar on the shock. The spring collar only adjusts the vehicle's ride height. Trying to make a spring stiffer or softer using the collar will only alter the ride height, and this will drastically affect the handling.

PUTTING A DAMPER ON THINGS

There's more to adjusting the damping of a shock than just changing the fluid. The size of the piston also affects damping. Most manufacturers offer different pistons for this purpose. Some shocks have adjustable pistons that allow you

to alter damping without changing oil or even opening the shock.

The two major ingredients here are "static damping" and "pack." These determine the shock's valving. Static damping is the amount of damping that



This assortment of springs is probably more than you'll ever need. Find a pair that works, and then get a softer pair and a stiffer pair for tuning versatility.

a shock has when moving up and down at a moderate rate. Using thicker fluid and a larger hole will return static damping to its original point, but it will reduce the pack.

Pack is the resistance of the shock to abrupt impacts, e.g., landing off large jumps. Pack can be adjusted by changing the size of the hole in the piston. A smaller hole will produce more pack because the fluid will be forced through a smaller area. A larger hole will produce less pack because the fluid has more area to pass through, which means that it will pass through more easily.



You can alter damping by changing your shock pistons and shock oil. Most manufacturers of shocks offer pistons that have different numbers of holes and pistons with holes of various sizes as well.

LETTERS

(Continued from page 8)

(707) 792-1316. Just about any after-market body will fit, but you might want to go to a local hobby shop and test-fit one while you're there.

—Doogie

DYEING TO KNOW

Your mag is excellent; I love all your helpful advice. But even after all that help, I still need some info. I own an RC10, and I'd like to know if I can spray paint the front and rear arms instead of dyeing them. Keep up the good work!

JERROD SCHUSTER
Grainfield, KS

You can use paint, but the results from dyeing are far superior. Paint won't stick that well, and it will chip off very soon. Paint will also bind your suspension. Dyeing the parts will permanently change their color as the dye soaks into the material. Use dyes!

—John

KENTUCKY FRIED CHARGER

I have an RC10 Team Car, and when I was charging my 1200mAh battery pack, my ProTech 702 charger short-circuited, and the meter fried. The local hobby shop can't fix it, and they don't know the phone number to call. I tried calling the number on the warranty, but there's no answer. Can it be fixed?

JEREMY WYCKOFF
Eastchester, NY

Jeremy, call Pro-Tech at (213) 462-2437. They should be able to help you. And, by the way: North, South, East, West...Pizza Mia is the best!

—John

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SPRING & PISTON SELECTION

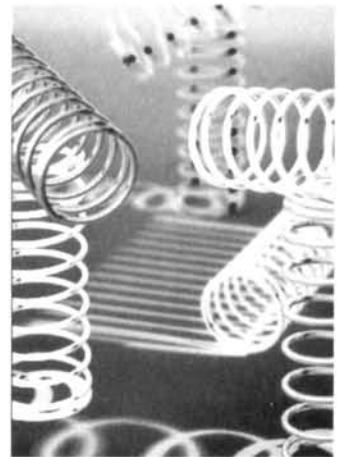


The viscosity of the oil affects how the piston travels through the shock body. Silicone oils, such as these from Team Losi and Team Associated, provide consistent viscosity despite temperature changes.

Generally, a very bumpy, rutty track requires less pack so that the tire can move up and down more quickly to absorb the impact. More pack is usually used on smooth tracks or tracks with huge jumps. Having more pack will make it harder for the vehicle to bottom out when it lands.

Getting the right combination of static damping and pack can be tricky. The best thing to do is to try to change the pistons and shock fluid a few times to get a feel for what the changes do to the handling. Keep these things in mind: use a slightly smaller hole in the front piston (more pack), because the front end usually has very little weight on it. When the car hits the face of a jump, however, the car's entire weight is on the front end. Having more pack will make the transition more consistent. When you've reached a good setup, the front and rear ends should be balanced (or at least close to it). In other words, when you drop the vehicle from about 6 inches, the front and rear end should compress and return at about the same speed and distance. If one end compresses farther, or returns faster, you might experience inconsistent handling on the track's bumpy sections.

Adjusting the valving (static damping and pack) of the shocks isn't something that everyone has to know how to do; I consider it a fine-tuning adjustment. I guarantee one thing, though: the big-name racers at large events will definitely be making these adjustments. ■



Glossary of Shock Terms

Ride height:

the height at which the chassis comes to rest after being dropped from a height of 4 to 6 inches.

Pack:

the resistance a shock has against a quick impact, such as landing off a jump.

Static damping:

the damping of a shock under a continual, moderate, up-and-down motion.

Valving:

the overall adjustment of the shock, including static damping and pack.

Viscosity:

the thickness of the shock fluid. The thicker the fluid, the higher the viscosity is.

Spring rate (pound rate):

a number that represents the force a spring generates when it's compressed. If you were to compress a spring against a scale, you would get a pound rating. These numbers are used to accurately compare springs to one another.

Race Checklist

by TIM MARTIN



Check
it out
and
check it
OFF!

HAVE YOU EVER arrived at the track only to find that you've forgotten a tool or some important piece of equipment—like your car or radio? Or have parts fallen off your car while it was on the track because they were loose or worn? You can avoid these problems and many others simply by using a checklist.

By using the checklists provided here, you'll not only avoid the problems listed, but you might also prevent others from occurring. For example: while you check the ball joint on your car, you notice that a ball end is loose. During further checking, you notice that the ball end itself isn't the problem; the shock tower to which the ball joint is attached is cracked. When you find problems like this, you can repair them before something breaks in a race and costs you another win!

The motor sections of the checklists are slightly different because they have subsections. All the

subsections need to be checked before the entire motor section can be checked.

This article only provides you with checklists. For more information on how to determine the condition of your parts, such as your motor's commutator or brushes, please refer to previous articles in *Car Action* that deal with the specific area you need help with.

About The Checklists

A. Pre-race checklist. Check the night before the race or as early as necessary so that you'll have time to correct anything that fails.

B. Packing checklist. Is everything packed for the race?

C. Heat checklist. Check this before each heat. Everything here and in the Main checklist should be checked, if time allows, but if there

isn't enough time, all you can do is check what you can and hope that your previous checks found all the other problems.

D. Main checklist. This is the same as the heat checklist, but it's nice to have a separate one for the Mains.

E. Post-race checklist. Check this when you return home after a race. This will allow time to purchase parts, if necessary.

A. Pre-race checklist

- All battery packs charged.
- Radio batteries charged.

B. Packing checklist

- Car
- Body
- Wing
- Radio
- Batteries
- Charger(s)
- Power supply
- All necessary tools (servo tape, screwdrivers, pliers, superglue, etc.) placed (neatly, of course) in your toolbox.
- Tires and/or other extra parts.
- Entry fee
- Other _____

C. Heat checklist

- | Heat 1 | Heat 2 | Heat 3 |
|---|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Springs on both sides of the car have been preloaded correctly. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Shock locknuts tight. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Tire locknuts tight. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Tires properly mounted on rims. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Toe-in is correct. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Camber set correctly. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All E-clips in place. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All ball joints fit tightly; bolt-on replacements in good condition; screws and locknuts are tight. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No loose parts (A-arms, battery holder, speed controller, receiver, etc.). | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All moving parts work freely. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| On/off switch firmly attached. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Correct battery in car. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All connectors in good condition. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Correct radio trim settings. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Pinion tight. | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Proper mesh between pinion and spur gears. | | |

- MOTOR**
 - Commutator clean.
 - Brushes clean and in good condition.
 - Connector in good condition (if applicable).
 - Wires firmly soldered.
 - Wires in good condition (not holding by a single strand of wire!).
 - Bearings or bushings clean, oiled and in good condition.

D. Main checklist

- Springs on both sides of the car have been preloaded correctly.
- Shock locknuts tight.
- Tire locknuts tight.

- Tires properly mounted on rims.
- Toe-in is correct.
- Camber set correctly.
- All E-clips in place.
- All ball joints fit tightly; bolt-on replacements in good condition; screws and locknuts are tight.
- No loose parts (A-arms, battery mounts, speed controller, receiver, etc.).
- All moving parts work freely.
- On/off switch firmly attached.
- Correct battery in car.
- All connectors in good condition.
- Radio trim settings are correct.
- Pinion tight.
- Proper mesh between pinion and spur gears.

MOTOR

- Commutator clean.
- Brushes clean and in good condition.
- Connector in good condition (if applicable).
- Wires firmly soldered.
- Wires in good condition (not holding by a single strand of wire!).
- Bearings or bushings clean, oiled and in good condition.

E. Post-race checklist

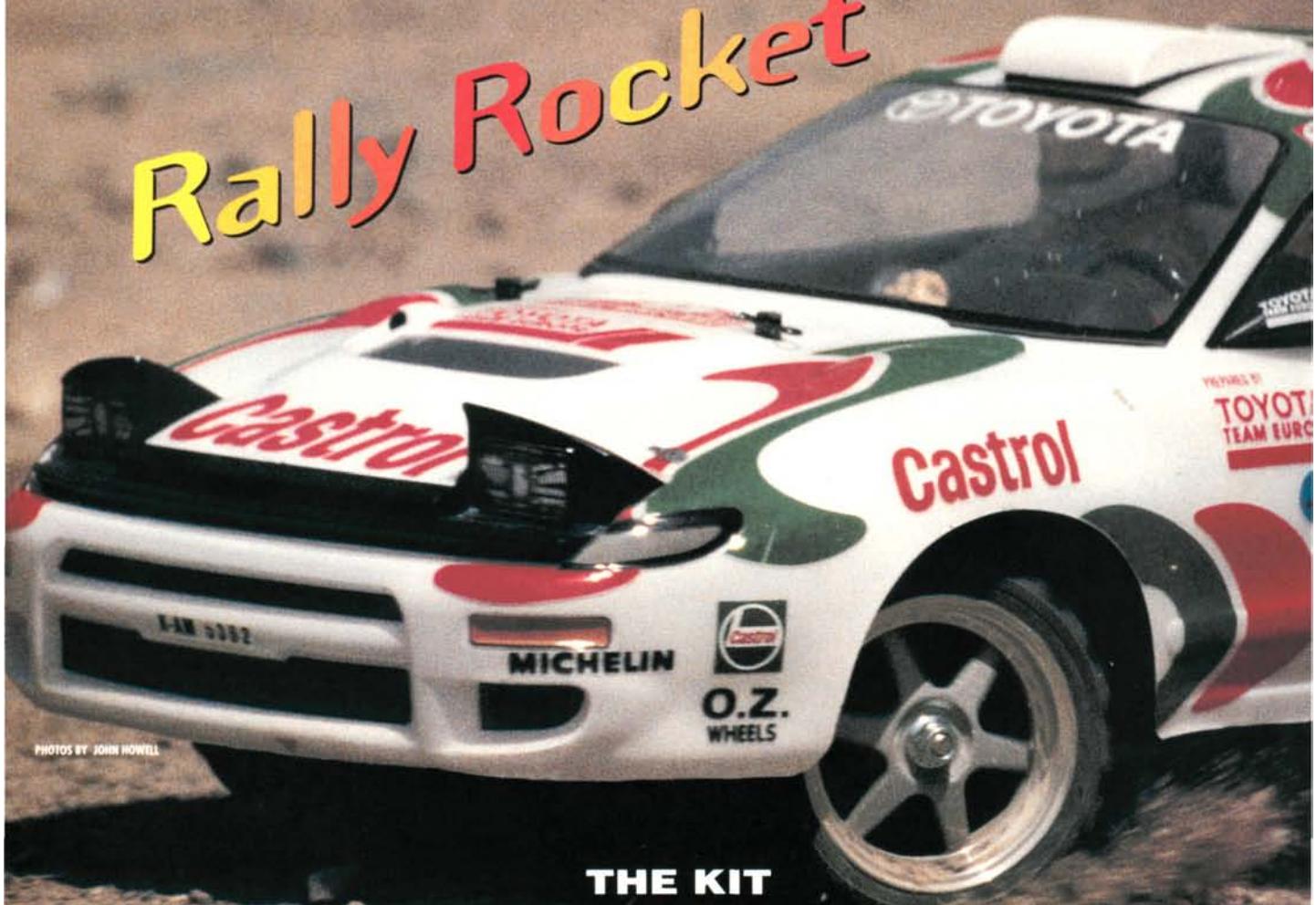
- No parts have stress marks or show signs of wear (A-arms, shock towers, caster blocks, ball ends, etc.).
- All moving parts work freely.
- All shocks full of oil.
- All connectors in good condition.
- Bearings clean and in good condition.
- Camber set correctly.
- All ball joints fit tightly.
- All locknuts that constantly become loose have been replaced.
- Toe-in is correct.
- Tires properly mounted on rims.
- Radio trim settings are correct.
- Gearbox smooth (not gritty) and set correctly.
- Tie rods straight—not bent and ready to break.
- No loose screws or nuts (including the nut behind the wheel) and no plastic screw holes show signs of stripping. Check them all.
- On/off switch firmly attached.

MOTOR

- Commutator clean and not pitted.
- Brushes clean and in good condition.
- Magnets strong.
- Connector in good condition (if applicable).
- Wires firmly soldered.
- Wires in good condition (not holding by a single strand of wire!).
- Bearings or bushings clean, oiled and in good condition.

I admire rally cars because they're capable of handling both on-road and off-road conditions. The Tamiya* Castrol Celica achieves this balance. Modeled after the '93 Monte Carlo Rally winner, the Celica has an amazingly realistic body and awesome handling characteristics.

Rally Rocket



PHOTOS BY JOHN HOWELL

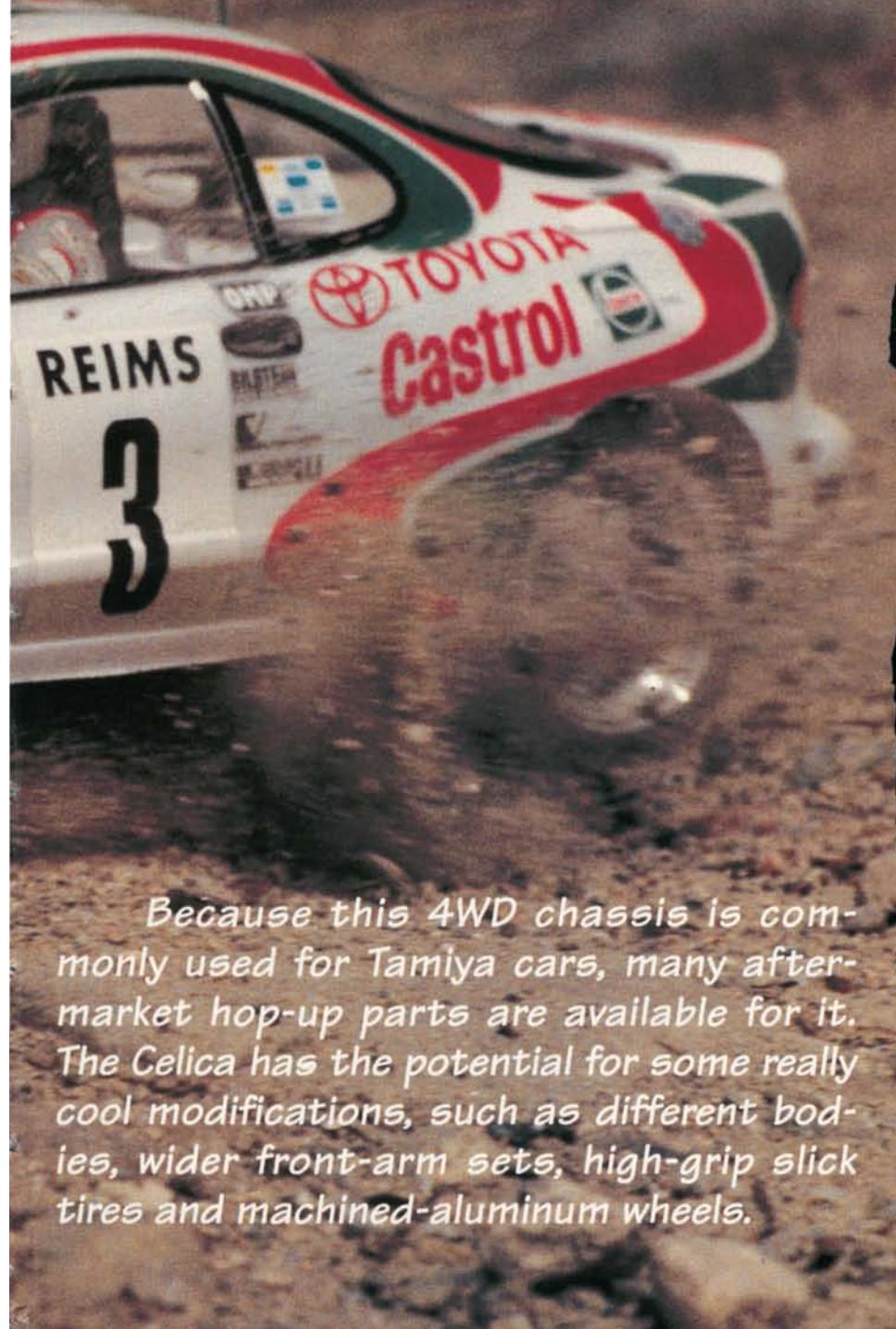
THE KIT

The best feature of the Castrol Celica is the incredibly detailed body that includes a full interior and two drivers. Two sheets of decals will help you capture the look of the full-size winner. Resting underneath the body is the popular Tamiya 4WD chassis with independent suspension damped by oil-filled, coil-over shocks. The car comes stock with a BEC mechanical speed controller and a 540 Mabuchi electric motor. The tires are treaded for driving on- and off-road.

TAMIYA

TOYOTA CELICA

by PAUL ONORATO



Because this 4WD chassis is commonly used for Tamiya cars, many after-market hop-up parts are available for it. The Celica has the potential for some really cool modifications, such as different bodies, wider front-arm sets, high-grip slick tires and machined-aluminum wheels.

Celica Success

When Tamiya chose a rally car to duplicate in R/C fashion, they didn't choose a slouch. In 1993, Toyota Team Europe's Castrol Celica was piloted to the World Championship of Drivers and won the World Championship of Manufacturers. The team, which has been around for more than 20 years, knows what it takes to win: a capable crew and a competent car.

This Celica is unique in that it can handle the most adverse terrain and go full force over a lengthy rally course. It's equipped with a 1,988cc, water-cooled, inline, 16-valve, 4-cylinder engine that produces 299hp at 5,600rpm. (That's quite a lot of horsepower to be squeezed out of such a small engine!) A six-speed transmission gets it through the woods and over the hill, and you find yourself at grandma's house in no time! Also, full-time 4WD helps keep the Castrol Celica on track at all times.

For 1994, Toyota Team Europe have left their winning '93 lineup of drivers and car relatively unchanged. "We have the best. Why should we change?" asked Ove Andersson, the team's president.

Well, it's a good thing they *didn't* change anything. As this issue goes to print, the success of Toyota Team Europe continues. They already have three wins—the Portugal Rally, the Safari Rally and the Corsica Rally—under their belt for the '94 season. Ah, the sweet smell of Celica success!....

Toyota Team Europe Celica.



TAMIYA CELICA

TAMIYA CASTROL CELICA

Scale 1/10
Price \$268

DIMENSIONS

Overall length 17.75 in.
Wheelbase 10.25 in.
Width (F/R) 7 in.

WEIGHT

Gross (w/o battery) 3 lb., 2 oz.

CHASSIS

Type Tub
Material Plastic

DRIVE TRAIN

Type Sealed gear
Primary Pinion/spur
Differential(s) Ball/bevel gear
Bearings/bushings Metal and plastic
bushings

SUSPENSION (F/R)

Type Indep. w/ fixed upright
Damping Oil-filled, coil-over shocks

WHEELS (F/R)

Type One-piece plastic
Dimensions (DxW) 2x1 in.

TIRES (F/R)

ELECTRICS
Motor 540 Mabuchi
Battery None
Speed controller Mechanical

OPTIONS TESTED: Futaba
FP2PBKA transmitter and receiver.

HITS

- Extremely detailed body
- Easy to paint
- Awesome handling and acceleration

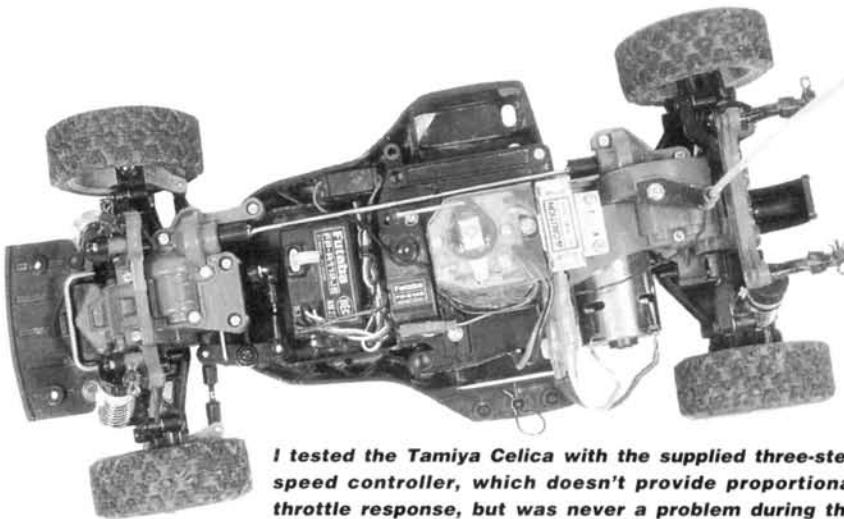
MISSES

- Applying decals takes time
- Center drive shaft is flimsy

GETTING IT TOGETHER

Construction begins with the assembly of the rear ball differential. There are many small parts involved in this step so read the instructions carefully. A hatch at the rear of the car makes it easy to reach the diff. Take out four screws, and the diff will pop right out.

Unlike the rear ball differential, the front has a bevel-gear setup. It's a much simpler design, but it works quite well. A metal center drive shaft transfers power from the rear gearbox to the front. Unfortunately, when the car is at high speed, the shaft wobbles a little. Fuel tubing used in place of the plastic cups will



I tested the Tamiya Celica with the supplied three-step speed controller, which doesn't provide proportional throttle response, but was never a problem during the tests.

hold the propeller shaft more securely, but it will still be a little wobbly.

After I had finished assembling the chassis, I noticed that the suspension needed stiffening. For a quick fix, I used the extra spacers that come with the shocks to increase the spring tension. I also found that the dogbones could be improved. The main shaft is metal, but the tips are plastic. Eventually, these ends will wear out, especially with a hotter motor. If you're interested in a hotter setup, dig out your July '93 issue of *R/C Car Action*, and check out the track report on the Tamiya Mercedes-Benz.

Painting and detailing bodies used to be my least favorite part of construction, because I could never get the bodies to look as good as the box art. With Tamiya's latest kits, however, detailing is much easier. The color schemes involve only one or two colors. Masking the windows is now a breeze, because Tamiya provides masking tape with the outline of the windows printed on it. The two decal sheets include every imaginable detail, from driving lights to the



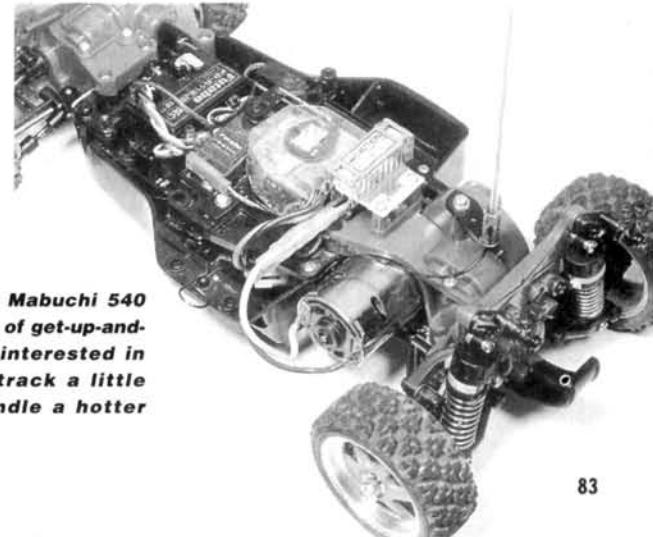
These cross-tread tires make driving on the street as much fun and as easy as off-road driving.

hood hold-down pins.

First, I cut out the masking tape and placed each piece on its corresponding window. Then I sprayed the entire car white. (Remove the masking before the paint is completely dry. If you wait too long, the masking can leave a sticky residue, and the paint can chip around the edge of the masking tape.) No additional painting was necessary. Now I was ready for the decals. Applying them took some time, but the finished product is worth it. Using some fine-tip paintbrushes and Testors model paints, I painted the interior and the two drivers.

PERFORMANCE

My first day out with the Castrol Celica couldn't come quickly enough! With a fully charged battery pack, I headed to a parking lot near my house. The four wheels



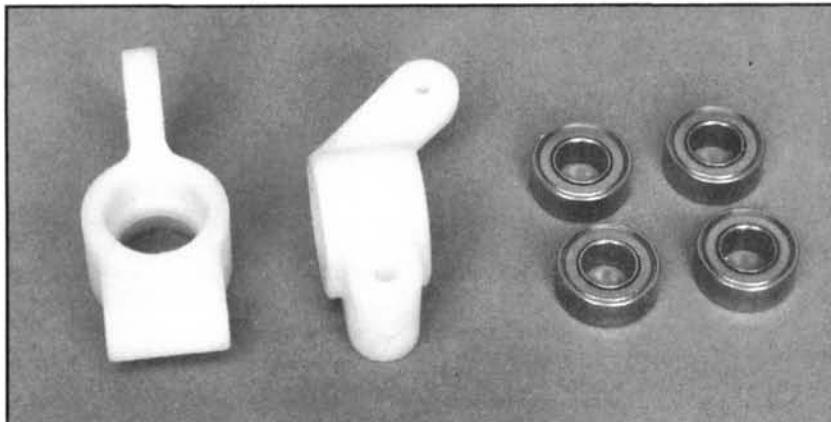
The Celica comes with a Mabuchi 540 motor that provides plenty of get-up-and-go power. And if you're interested in moving along the rally track a little faster, it can easily handle a hotter motor.

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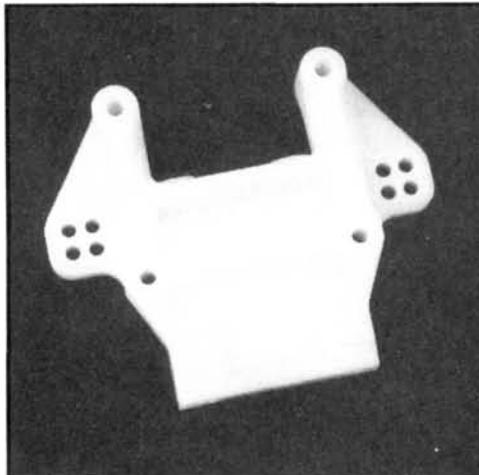
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#7035 Rear Bulkhead for RC10GT

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TAMIYA CELICA



The Celica's suspension was a little soft, so I added a set of shock-collar spacers and filled the shocks with oil that's a little thicker than the oil that came with the kit. With those mods, the car didn't succumb to any excessive body roll through fast sweeping turns.

quickly hooked up to the pavement, and the Celica was instantly at full speed. Sliding at full speed into turns didn't faze this car. It was amazingly sure-footed, which makes the driver's job a cinch. Smaller bumps and dips in the pavement were soaked up by the suspension.

As I raced the Celica, I noticed a dirt path along the side of the parking lot, and I headed for it. The car did as well in the dirt as it did on the pavement. As long as I didn't hit any big bumps, it performed well.

The Castrol Celica has a lot to offer intermediate and even more advanced R/C'ers. With the large number of after-market options, you can upgrade the car as your skills improve.

*Addresses are listed alphabetically in the Index of Manufacturers on page 153. ■



INDEX OF MANUFACTURERS

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115 ADVANCED PRODUCTS P.O. Box 1193 Middletown, MA 01949 (508) 532-1620 (508) 532-8920 (fax)	94 BYRON ORIGINALS P.O. Box 279 Hwy. 59 & 175 Ida Grove, IA 51445 (712) 364-3165 (712) 364-2028 (fax)	94, 109, 111 DURATRAX Distributed by Great Planes Model Distributors	94, 95, 109 DYNAMITE Distributed by Horizon Hobby Distributors	104 MOTION GRAPHICS 2645 Robert Arthur Rd. Westminster, MD 21158 (410) 848-0008	114 RUSTY'S RACING PRODUCTS 10550 Noland Rd. Overland Park, KS 66215 (913) 888-4042
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117 AMERICAN ENERGY MARKETING P.O. Box 610284 Port Huron, MI 48061-0284 (519) 542-3190 (519) 542-9541 (fax)	117 CRICKET RACING PRODUCTS USA 4524 Doig Ln. Las Vegas, NV 89110 (702) 437-8502 (702) 437-8529 (fax)	88 GRAND MOTORSPORTS 9360 Newton Ave. N. Durham, NC 27709 (919) 382-0166 (919) 382-0166 (fax)	118 INFORMATION MANAGEMENT SOLUTIONS INC. P.O. Box 13263 Durham, NC 27709 (919) 382-0166 (919) 382-0166 (fax)	96, 113, 115 MUGEN USA LTD. 7021 Veterans Ave. Brooklyn, NY 11234 (718) 251-7660 (718) 241-8435 (fax)	89, 91, 92, 116 SCHUMACHER INC. 6302 Benjamin Rd., Ste. 404 Tampa, FL 33634 (813) 889-9691 (813) 889-9593 (fax)
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PROJECT '29



Part 4

FLAMIN' IT!

by MIKE OGLE

CUT AND DRILL ▶

1 If you're building your own "Project," now is the time to trim the body and test-fit all the components to make sure that everything fits. It's much easier to see what's in the way when the body is clear! Be especially careful to allow enough clearance between the body and your ESC's heat sinks. During all that test-fitting, you surely had your hands all over the inside of the body, so before you do anything else, wipe it down with rubbing alcohol. If you don't, every finger-print and little piece of crud will be showcased under several glorious coats of paint, and there won't be a darned thing you can do about it (except for some strategically placed decals!).



◀ MASK IT

3 Several materials can be used to mask off your flames, e.g., standard wide masking tape, any of the available liquid-masking products or, my favorite, self-adhesive shelf-covering paper. It comes in a variety of colors; it's vinyl-based, so it stretches and clings to even compound curves; and it won't soak up paint like paper-based masking tape.

clings to even compound curves; and it won't soak up paint like paper-based masking tape.

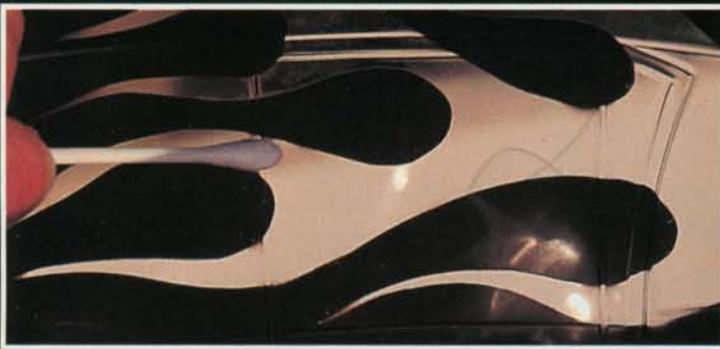


◀ MARK 'EM

2 Use a Sharpie pen on the outside of the body to lay out your flames; the marks will come off with alcohol. There are two types of flame design: the hard, jagged, sawtooth flame pattern and the classic, rounded "flowing" flames that most people really want. If you're not sure of your artistic abilities, just trace around the flame template provided in this issue (see page 150).

◀ PLACE IT

4 Peel your flames from their backing sheets, and lay them on the inside front of the body. Start by applying the base of the flame, and work your way back to the tips. If you don't get it into just the right position on the first try, peel it off (again, front to back), and reposition it until it's right where you want it. Finally, burnish it down with your fingernail, a popsicle stick, or something similar.



ACCENT IT ▶

6 To give a little extra color to Project '29's scheme, I sprayed a little thinned Pactra* Pearl Purple into the recessed areas around the flames. Although mostly invisible, when viewed from certain angles, it shows up as a brilliant blue. After the main body color paint has dried, quickly (and gently) wipe down the body with rubbing alcohol to remove any adhesive left from the flame masks; otherwise, it will grab and hold any contrasting paint overspray.



ASPICE IT ▶

7 A little red paint right in the crook of each flame adds depth and dimension. Without it, they just look "flat."

That's it! I hope that you've enjoyed this series and that it has inspired you to experiment and build your own dream car; after all, that type of automotive self-expression is what keeps the hot-rodding spirit alive, even in 1/10 scale!

VOILA! ▶

8 And this is what you end up with! By starting with white, then fading to yellow with red/orange detailing, your flames will have that classic look.

* Addresses are listed alphabetically in the Index of Manufacturers on page 153. ■

CAR ACTION EXCLUSIVE

Cliff Lett's Team Car

A

SSOCIATED'S* TEAM CAR is one of the most successful—if not *the* most successful—2WD race cars. The competition is hot and heavy, but the Team Car is still the “winningest” car around.

Have you ever wondered why the Associated factory drivers' Team Cars always seem to be dialed, regardless of the track conditions? Do the factory drivers' Team Cars always seem to work better than yours, even though you use the same car, motor, batteries, tires, body, electrics, etc., etc.? What's their secret? Have they done something to their cars that makes them work

better? Yes and no. They aren't using special, trick parts that you can't get; their secret is how they build and tune their cars.

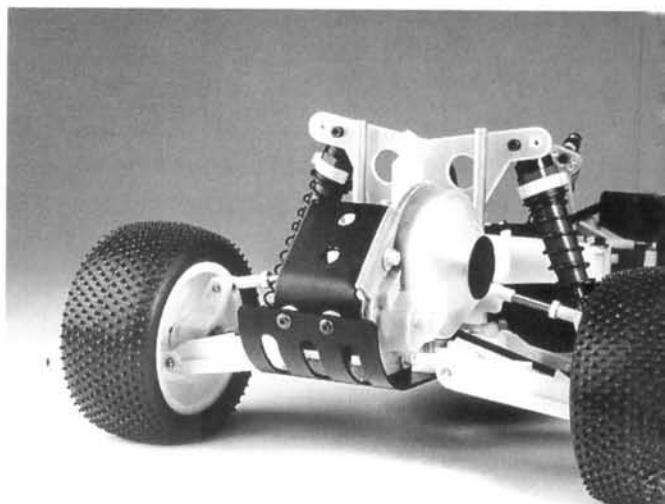
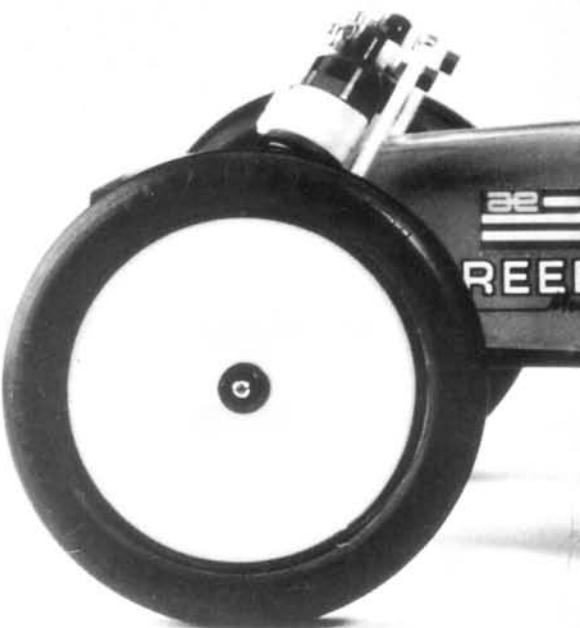
According to Team Associated's

Cliff Lett, there's a right way and a wrong way to build a Team Car. There are many small details that, if overlooked during assembly, can hinder your Team Car's performance potential. In addition, I'll bet you didn't know that the factory drivers use what they call the “standard setup” whenever they race at a new track. They've found that this setup works best at most tracks, and getting their cars totally dialed-in is usually just a subtle variation of it.

With Cliff's help, we'll tell you how the factory drivers assemble and tune their cars, and we'll describe the methods they use for “dialing in” to different tracks. We're even going to discuss the stuff the factory drivers don't tell one another. In Cliff's words: “Hey, why keep secrets? All that shows is a lack of confidence, right?”



With Cliff's help, you'll soon be tearing up your local track with a factory-spec Team Car. Shown here is the completed car with Associated's new molded wing and RPM's molded spring clips. An RCPS Turbo Mirage body with a killer paint job by Bich'n Bodies* rounds out the package.

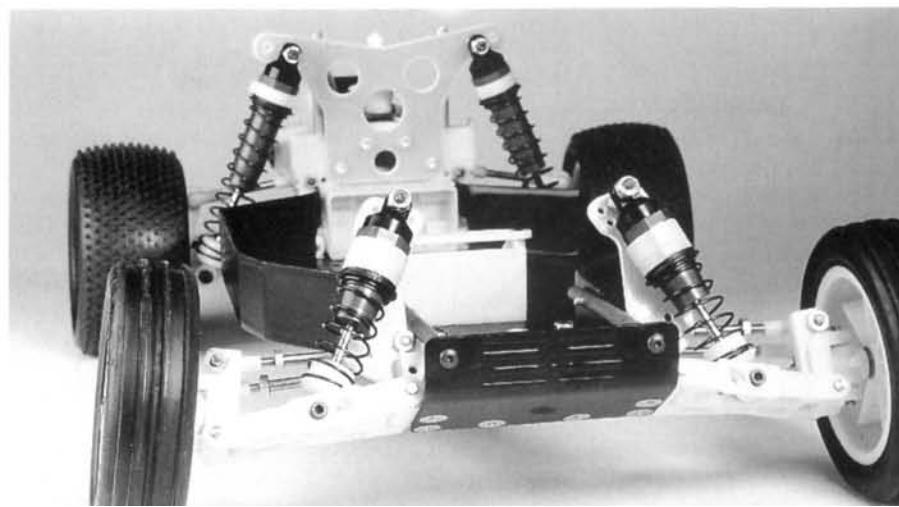
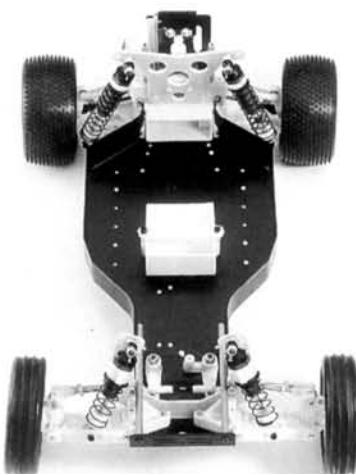


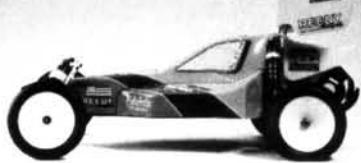
BUILD A FACTORY "WORKS" RIDE

Setup



PHOTOS BY WALTER SIDAS





The Stealth Transmission

Cliff says that the heart of the Team Car is the Stealth transmission, and this is where assembly begins.



1 • Thrust bearing.

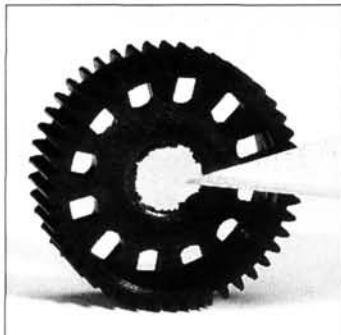
Installing the differential thrust-bearing assembly can be a pain, but try it this way: slide one of the thrust washers onto the screw and put some grease on the washer (use only Associated's black grease). Put all six thrust balls in a

straight line in one of the lines of your palm. Hold the threaded end of the screw, and roll the greased washer along the row of balls, picking up the balls (one at a time) until they're stuck to the washer in a neat circle. Install the second washer on the screw, and slide the assembly into the appropriate diff hub. Be sure to inspect both hub cavities for excess material left from manufacturing.



2 • Diff gear.

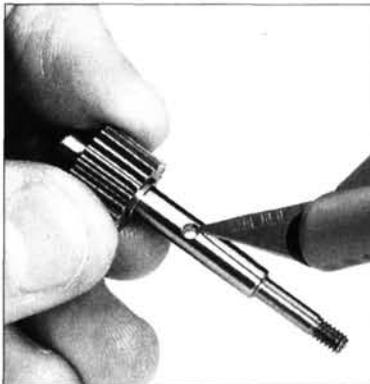
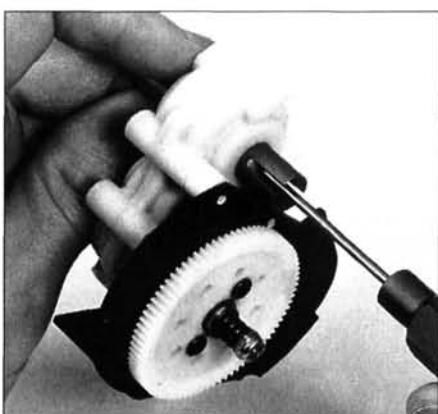
Any flashing that's left on the inside of the diff gear must be carefully trimmed away. Using an X-Acto knife, remove the flashing and chamfer both sides (be very careful not to enlarge the hole, or you'll ruin the gear). When you apply the Stealth lube to the large diff balls, fill the ball holes with lube and then snap in the balls. Finally, completely fill the area around the balls with lube.



3 • Setting the diff.

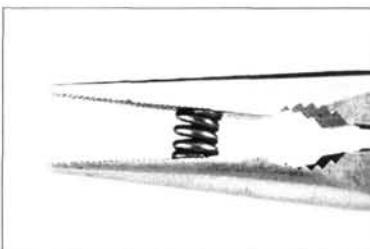
The Stealth differential was designed to take the guesswork out of diff adjustment. Is it too tight? Too loose? Forget it! Just adjust the thrust screw exactly

$\frac{1}{8}$ to $\frac{1}{4}$ turn out from the bottom position—*no other way!* This is the most important setting in the car. Take your time and do it correctly. Use a good hex driver (Associated part no. 6959) to do this; *not* an Allen wrench, which can strip or damage the diff screw. Once adjusted, the diff action should be free and smooth. Usually, when the diff feels rough, the small thrust-bearing washers are the cause.



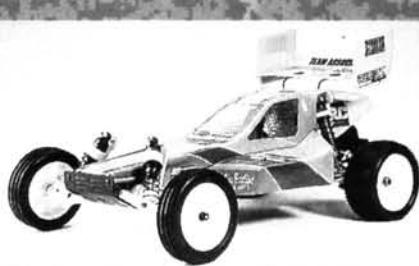
4 • Slipper roll pin.

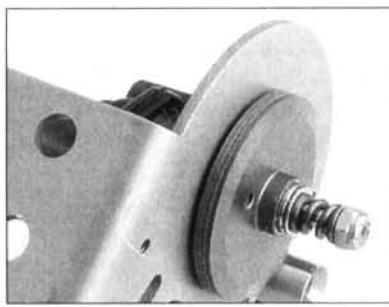
Before you install the roll pin, which secures the slipper's inner hub, deburr the upper shaft hole, and squeeze each end of the roll pin with a pair of pliers. This will make installation easier and allow the inner hub to sit flat against the pin. Install the roll pin with the groove facing the transmission case.



• Slipper spring.

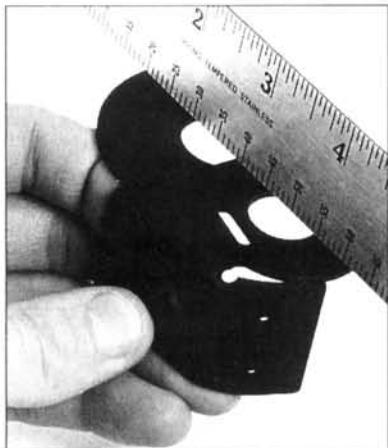
Like any other spring, a new slipper spring will "take a set" after use. This means that it will be slightly shorter after being fully collapsed, but its rate will be the same. You can bypass this change by collapsing the spring yourself with a pair of pliers (a couple of times will do).





5 • Setting the slipper.

When you've set your slipper properly (according to the Team Car's instructions), you really won't have to alter it much for different tracks. If your track has a ridiculous amount of traction, adjust your slipper to prevent wheelies. If your track has low traction, adjust the slipper for about 2 feet of slip, or make it tight enough to clear certain obstacles (doubles, etc.). *Do not lock the slipper.* This will damage the diff.



6 • Motor-mounting plate.

A bent motor-mounting plate is the number one cause of a loud transmission. Periodically check your motor-mounting plate with a straightedge. If it isn't straight, you can straighten it, but it's better to replace it with a new one, because the plate will be weakened after it has been bent.

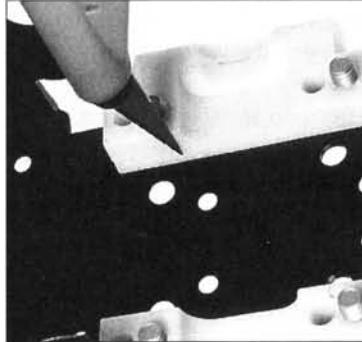
There's really nothing else to do to improve the Stealth transmission; just assemble it according to the instructions. If you'd like to make it a little lighter, use aluminum tranny-case screws (Associated part no. 6935).

Building the Chassis

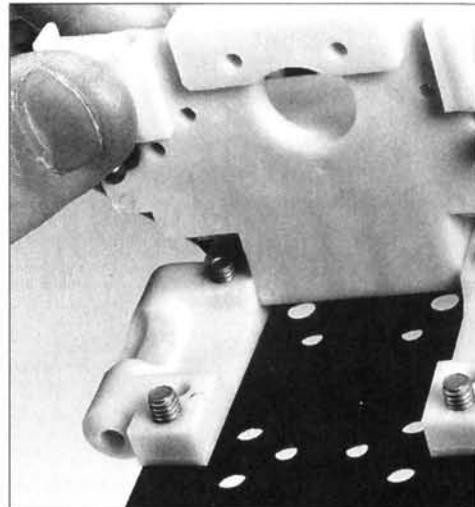
After you've built the tranny, it's time to assemble the main chassis. Cliff has a few pointers that will make assembly go more smoothly, and he has some neat tricks that will boost your Team Car's performance.

1 • Rear arm mounts and bulkhead.

According to Cliff, you should mount the transmission on the chassis with the rear bulkhead and the arm mounts installed. Attach the rear arm mounts, then the bulkhead. If the bulkhead doesn't drop in and fit easily, you might need to trim a little



material from the arm mounts with an X-Acto knife. A bulkhead that fits too tightly can force the rear arm mounts out of alignment. The rear toe-in angle is vitally important to performance, so any misalignment can cause poor handling.

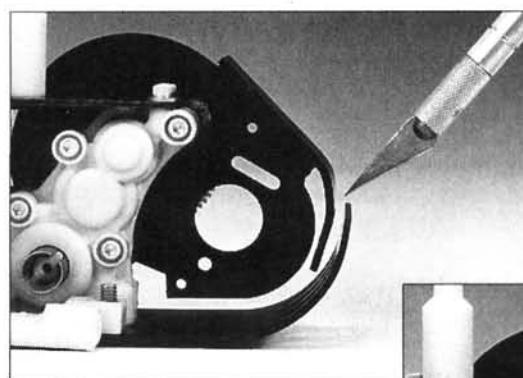


2 • Installing the transmission.

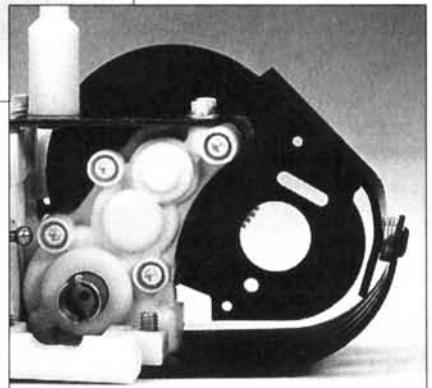
When the bulkhead is in place and the bottom and side screws are tight, it's time to install the transmission. Cliff says that this part of the assembly is critical. Mount the tranny on the chassis with the four flat-head screws, and then attach the upper brace. It's a good idea to use Associated's graphite brace (part no. 6593); it will

strengthen the rear of the chassis. The motor-plate holes must match the rear chassis holes perfectly. Any misalignment here might change the rear anti-squat angle.

If the holes don't match up, there are two things



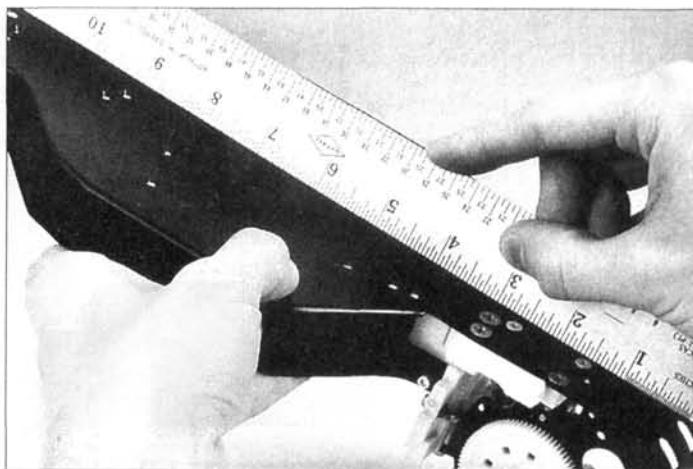
you can do. You can carefully bend the rear end of the chassis and the motor plate so that they match, or you can put one or two small, .031-inch-thick washers (Associated part no. 6936) between the two surfaces. Either way works, but take your time, because this step can greatly affect the way your car handles.



Building the Chassis

3 • Checking the chassis.

Use a 12-inch steel straightedge to check the chassis bottom. If your car is involved in a severe crash, use the straightedge to determine whether your chassis has been bent. It's a great toolbox item for serious Team Car drivers. Associated offers 4-40 aluminum flat-head screws that work well for mounting the transmission on the chassis (part no. 6933).



Suspension Do's and Don'ts

Many feel that the key to the Team Car's success is its excellent suspension. Here, Cliff tells you how to assemble your Team Car's suspension for the best performance.

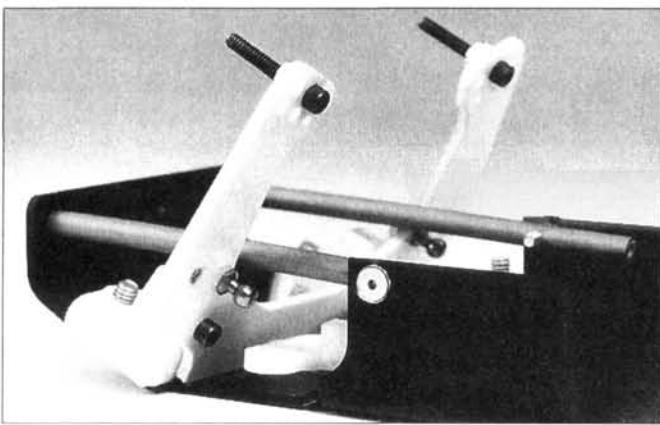
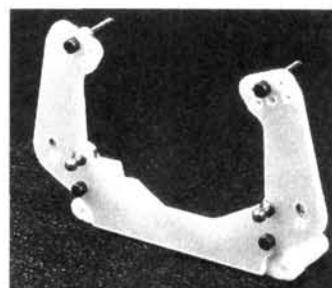


plate. When he installs the nose-brace tubes, Cliff countersinks the side chassis mounting holes and uses flat-head screws (part no. 6292). This prevents the tubes from moving around and makes the assembly more rigid.

1 • Nose plate.

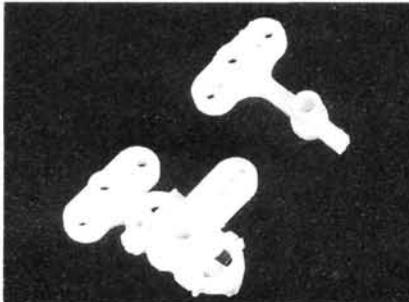
Cliff says that the team drivers lighten their Team Car's nose plate by cutting excess material from around the three mounting screws. To assemble the nose plate, install the upper shock-mounting screws (in the upper middle tower position) and lock them with a self-locking aluminum nut (Associated part no. 6937). Then install the upper-link ball ends, and lock them into place with an aluminum nut (part no. 6449).

Mount the shock tower on the front arm mounts and install the entire assembly on the nose



2 • Steering bellcranks.

Cliff says: "Some on our team have been using the Houge/Composite Craft* steering bellcranks with good results, but the standard steering bellcranks work just fine if you install two small tie-wraps around the standard servo-saver."



3 • Arms, steering blocks and hub carriers.

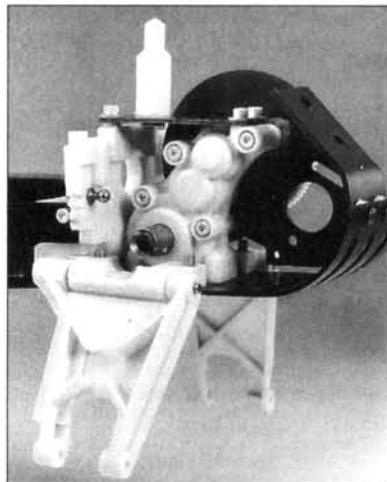
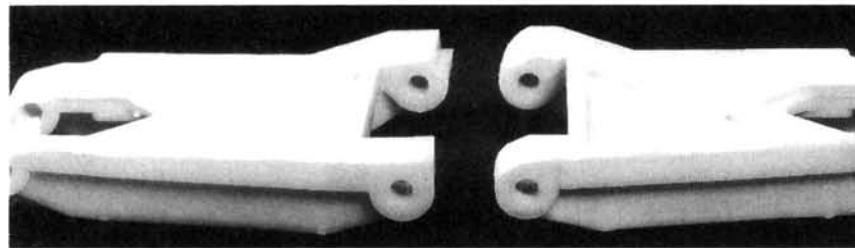
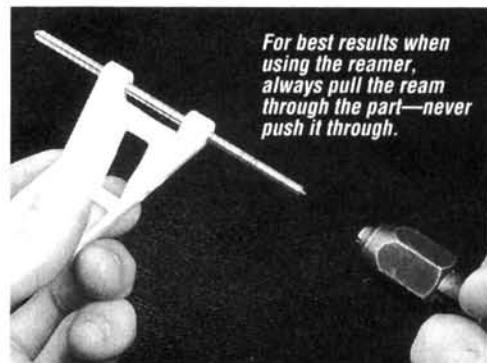
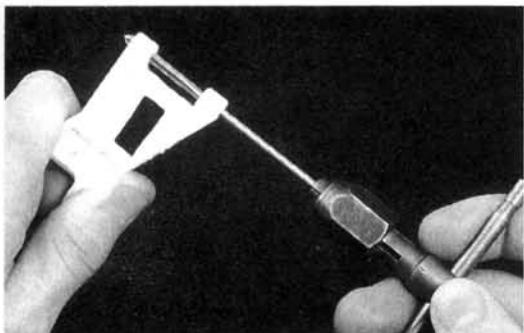
These should be assembled so that they operate with as little friction as possible. The arms should always pivot on the hinge pins (or, for the steering blocks, in the block carrier). They shouldn't pivot in the rear hub carrier, the rear arm mount, the front arm mount, the front block carrier (outer hinge pin) or the steering block. In these parts, the hinge pins should fit tightly.

4 • Titanium hinge pins.

Many of the team drivers use titanium hinge pins (available from R/C Performance Specialties [RCPS*] or Lunsford Racing*) to minimize corrosion and to strengthen and lighten the suspension.

Some titanium hinge pins are made slightly oversize to provide a tighter fit. This means that you might have to fit them in the arms. To ensure free movement, Cliff runs a .1285-inch diameter, no. 30 straight flute ream (available at most tool supply stores or through RCPS) through the arms and the block carriers, if needed. *Do not* use a Dremel tool to ream the arms. Use only a hand-chuck or a slowly turning drill bit. Otherwise, you might enlarge the holes too much.

When the suspension arms—with hub carriers and block carriers—are assembled, they should fall easily under their own weight (without the shocks attached, of course).



5 • Trimming the rear arms.

Trim the Team Car's rear arms where they're fastened to the rear arm mounts. The arms have "down stops" molded into their inner sides. These aren't needed with the Team Car (the shocks now limit travel). To obtain the correct amount of rear suspension travel, Cliff trims the down-stop area off each rear arm. This will already be done on newer Team Cars.

6 • Titanium turnbuckle linkage.

To reduce weight and ease adjustment, most of the team drivers use titanium turnbuckles. They're available from RCPS and Lunsford Racing. When you install ball cups on the turnbuckles,

hold the ball cup by the hex flats with a pair of standard pliers, and screw the turnbuckle into the ball cup using the appropriate wrench.

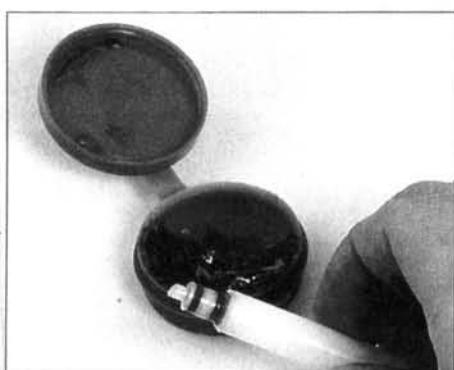
Much of the Team Car's handling is determined by its shocks, and Cliff is just the man to tell you how to get the most from your Team Car's shocks.

and Now... the Shocks!

1 • Shock seals.

Trim the shock's internal parts with an X-Acto knife, leaving no molding gate whatsoever on them. In fact, it's better to trim a sliver off the part than to leave any of the molding gate attached. Coat all the seal's parts, especially the O-rings, with RCPS "Green Slime" (part no. 060). This lubricant was developed for full-size racing-suspension seals, and it works especially well for this application.

Put the parts on the assembly tool, and install them in the body. If the assembly doesn't "click" together, check the parts again for remaining molding gate.



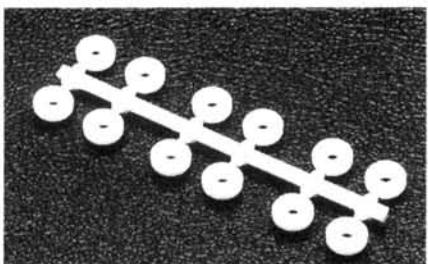
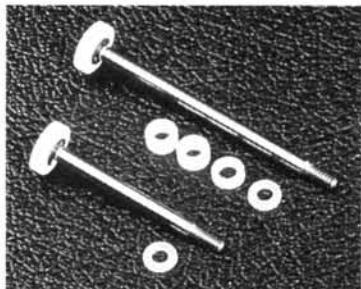
and Now... the Shocks!

2 • Shock travel limiting.

Limit rear-suspension travel by installing spacers over the shock shaft (under the piston). There are three different plastic spacers from which to choose: the shock O-ring spacer (.125 inch thick), the rear dogbone spacer (.062 inch thick) and the shock O-ring washer (.031 inch thick). These three will give you numerous combinations for controlling suspension travel. Associated now packages all of these together (part no. 6466).

Cliff suggests that, in the rear, you start with 1.32 shafts and

two .125-inch spacers, one .062-inch spacer and one .031-inch spacer; up front, use one .031-inch spacer. Don't use silicone tubing for shock-travel-limiting spacers; it will compress, and your drive shafts will eject.



3 • Shock pistons.

Associated now offers new shock pistons (part no. 6465) that you can use to tune your suspension to different tracks. Cliff suggests that you start with the new, no. 1 pistons and Associated 30W silicone shock oil (part no. 5422).

5 • Springs and mounting positions.

Use black springs for the front shocks and green springs for the rear. Always use the barrel-shaped upper shock bushings. When you install the shocks, be very careful not to overtighten the upper mounts. Allow the shock to pivot freely. Install the rear shocks in the inner tower hole and the outer arm hole, and attach the front shocks in the upper middle hole in the tower and the outer arm hole.

4 • Filling the shocks.

This step is really a piece of cake. Fill the shock to the top of the body with 30W silicone oil. Pump the shock a couple of times so that the air moves to the top. Refill the shock to the top of the body and push the shaft in until the piston is flush with the top of the body (the piston will still be covered in oil), and install the shock caps. Screw them on slowly while you hold the shock at a 45-degree angle.

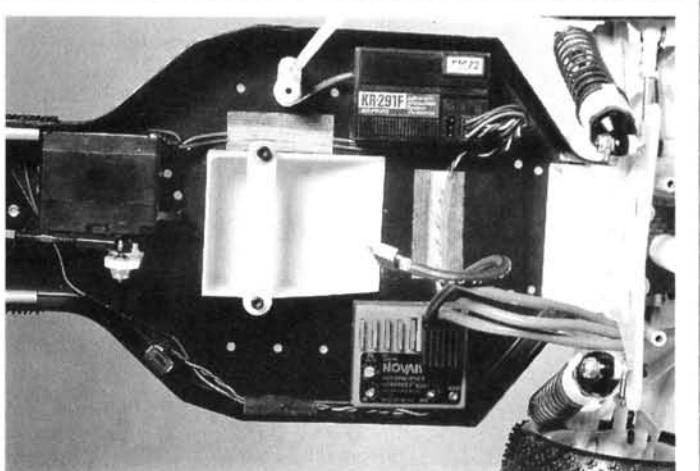
When you've finished, the shaft should compress all the way *easily* and only spring back about $\frac{1}{4}$ inch. Assemble the rest of the shock according to the instructions, but use one red O-ring on the shaft between the spring retainer and the body (rear shocks only).

Radio Gear Installation

1 • Install the radio gear.

When he installs radio gear, Cliff puts the speed controller on the car's left side and the receiver on the right. This arrangement allows him to keep the ESC's battery and motor leads as short as possible (as you know, the longer the wire, the greater the resistance, and the less power it will carry to the motor). This setup also keeps the wires away from the receiver's antenna. (Current-carrying wires can cause radio interference if they're too close to the antenna.)

For steering, use a high-speed, high-torque servo, and install it as far forward as possible. You'll probably have to trim off the servo's front mounting tabs for it to clear the Team Car's aluminum nose plate. Cliff uses an Airtronics* 94737 or 94151 servo in all of his cars.



The Standard Setup

When they travel to a new track, almost all the Associated team drivers begin with a standard Team Car setup. By using this setup, Cliff and the Associated team know that they'll be "in the ballpark" wherever they race, and it won't take much to dial-in their cars totally.

Small static adjustments and changes in tires, foam inserts, springs, oil and ride height usually give the team the awesome setup

The Standard Team Car Setup

they're looking for. Always remember that you really shouldn't stray too far from the standard setup, regardless of track conditions.

• Front suspension.

- One .031-inch shock-travel-limiting spacer (one shock-seal washer)
- Associated 30W silicone oil
- No. 1 pistons (new style)
- Black springs (softest fronts)
- Upper mount in middle top hole of shock tower
- Lower mount in outer arm hole
- Ride height: arms level (straight across)

• 25-degree caster blocks

- 2 degrees negative camber each side
- 0 degree toe-in
- Pro-Line* XTR ribbed (vented), no foam inserts

• Rear suspension.

- 1.32-inch shock shafts with two .125-inch spacers, one .062-inch spacer and one .031-inch spacer
- Associated 30W silicone oil
- No. 1 pistons

• Green springs

- Upper mount in inside hole of shock tower
- Lower mount in outside arm hole
- Ride height: arms level
- 2 degrees negative camber each side
- 3 degrees toe-in (1.5 degrees in the arm mount and 1.5 degrees in the hub carrier)
- Pro-Line mini-pin XTR or 7022 XTR (both with three-quarter foam insert)

Now that you have the same setup as the factory drivers, Cliff discusses each setting (in the order listed in the setup chart) and how you can alter them to tailor your Team Car's handling to a specific track condition.

1 • Shock extension travel.

Under normal conditions, the suggested setting will work fine. For smooth, high-grip conditions, however, you might want to limit the shock's extension travel by installing one .062-inch spacer in the front shocks and as many as three .125-inch spacers in the rear. When you change shock travel, you might have to adjust the universal drive-shaft spacing to prevent binding, or to prevent the shafts from being ejected from the drive cups.

For bumpy and slippery conditions, you can increase travel by removing the .031-inch spacers (both front and rear).

2 • Shock oil and optional pistons.

With Associated's new Teflon shock pistons, drivers can control the way their cars handle rough terrain and different jumps better. The standard setup will work best under most conditions.

On somewhat smooth tracks that have large jumps, however, you might want to try no. 2 pistons (smaller holes) with lighter oil. When you change pistons, try to keep the "static" feeling the same (this is the way the car feels when you compress its suspension on your workbench). Jumping, landing and cornering will be improved when you use the no. 2 or no. 3 pistons (smallest holes; you'll need to use even lighter oil to achieve the same static feel).

If the track has choppy bumps, however, no. 1 pistons with 30W oil should work best and provide the most traction.

3 • Springs.

Cliff and the rest of the Associated team use black front springs and green rear springs on nearly every track they race on. For high-traction conditions, you might want to try springs that are one step firmer, but silver springs are as stiff as you should ever use on the front or rear.

For slippery or bumpy tracks, try a black rear spring or a green front spring. This will reduce steering and make the car a little easier to drive. Cliff recommends that you always use Associated's springs: "They're manufactured to tighter tolerances than anything in the industry today," he notes.

4 • Shock-mounting positions.

"It's very rare for us to change the shock-mounting position," says Cliff. For extremely bumpy tracks, however, try mounting the rear shocks one position in on the arms. If you do this, the arms will extend further downward, so you must limit the shock travel to prevent the drive shafts from being ejected.

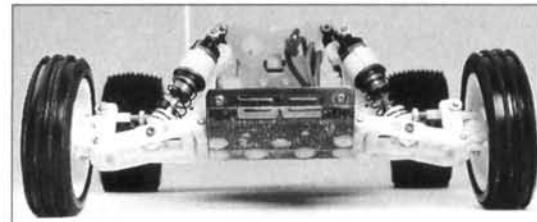
If you'd like to add steering, try mounting the rear upper shock's mount to the outside

Dial-in the Team Car

hole on the tower. Keep in mind that moving the shock inward on the arm or tower will soften the springs and damping. Obviously, moving it outward will stiffen the springs and damping. Cliff doesn't recommend that you change the front shock-mounting positions.

5 • Ride height.

This is probably the most misunderstood adjustment on the Team Car. Changing the shocks' spring collars *does not* soften or stiffen the springs; it only changes the car's ride

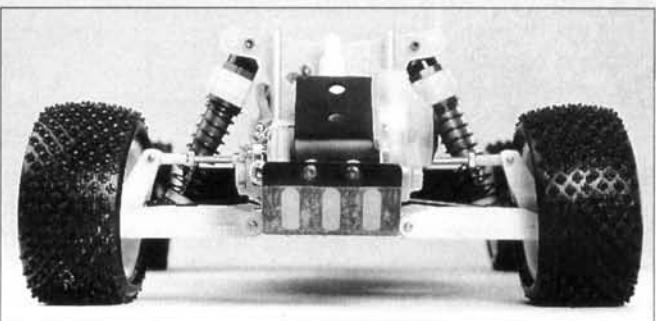


height in relation to the ground. Cliff suggests that you lower the ride height for high-traction conditions and raise it slightly for low-traction areas.

Keeping the car low on high-traction conditions will improve cornering and minimize traction roll. Raising the car for low-traction conditions will slow the car's reaction when it changes direction and add high-speed steering. If the car jumps with a nose-down attitude, it's usually because the rear ride height is too low. Small changes in ride height make a big difference on the track.

Dial-in the Team Car

Keeping the car low on high-traction conditions will improve cornering and minimize traction roll. Raising the car for low-traction conditions will slow the car's reaction when it changes direction and add high-speed steering. If the car jumps with a nose-down attitude, it's usually because the rear ride height is too low. Small changes in ride height make a big difference on the track.

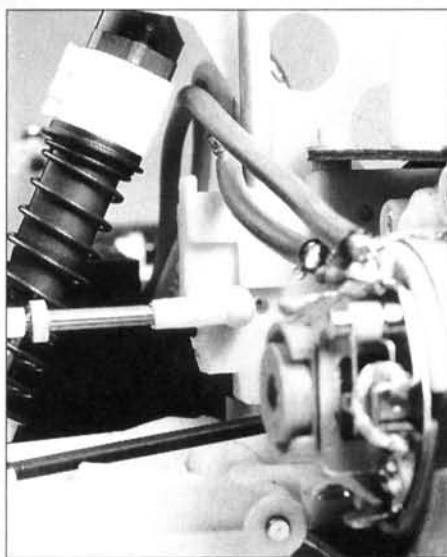


6 • Camber.

This is extremely important. A tire's maximum traction is achieved when it's perpendicular to the ground. For the rear tires, this will cause understeering in most conditions, and possibly traction-rolling in high-traction conditions. Cliff suggests that you set the front and the rear tires with 2 degrees of negative camber. RPM* makes a nifty and inexpensive gauge that will help you to do this accurately.

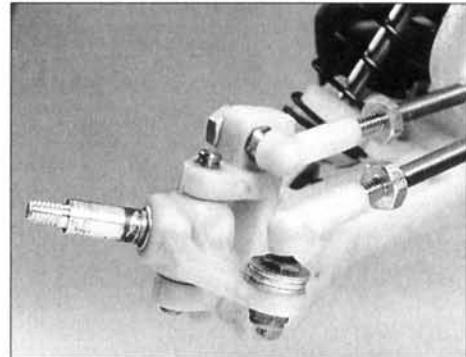
If you want more steering, reduce front camber to 1 degree negative or 0 degrees. If more rear traction is desired, decrease rear camber to 1 degree negative or 0 degrees. Using little negative camber or 0 degrees will cause the car to slide unpredictably. Try to use at least 1 to 2 degrees of negative camber at all times.

Some of the team drivers move the rear, upper-link, inner ball joint outward .200 inch. This shortens the upper link and, thus, changes the camber rise (the amount camber changes as the suspension is compressed). You'll gain a little steering by doing this, and slides will be more controllable, but you'll lose some rear traction.



7 • Caster.

The factory drivers almost always use 25- or 30-degree caster blocks. Thirty degrees of caster will add some turn-in steering, but it will cause a little understeering when exiting corners and on high-speed sweepers. The 30-degree blocks will also stabilize the car on fast, bumpy conditions. Using 20- or 25-degree caster blocks will give the Team Car more low-speed steering and more "corner-exit" steering. When you use 25- or 30-degree blocks, use two .031-inch aluminum washers (Associated part no. 6936) under the outer steering-link ball joint. This will keep bump-steer to a minimum.



8 • Toe-in.

Adding toe-in to the Team Car's front tires will increase stability during acceleration, but it will also decrease turn-in steering. Toe-out will add turn-in steering but will cause instability when accelerating, especially through bumps. Both toe-in and toe-out will scrub speed, so try to use as little of both as possible.

Says Cliff, "I don't recommend using more than 3 degrees of rear toe-in per side. Using rear toe-in in the arm mount will add rear traction, but it will cause 'rigidness' when accelerating through bumps. Jumps and landings, however, will be improved. Using toe-in in the hub carrier will give slightly less traction but will allow the suspension to work more smoothly through bumps. Splitting up the toe-in (1.5 degrees in each hub carrier and arm mount) will tend to be middle-of-the-road. Bumpy tracks tend to favor toe-in in the hub carriers. Slippery, smooth tracks usually favor toe-in in the arm mounts."

9 • Tires and foam inserts.

There are many good tires, but knowing how to tune your Team Car using tires is something of an art. Most of the softer tires—especially Pro-Line XTR compound—require full foam inserts to prevent them from becoming distorted. The inserts increase traction substantially. To find the perfect combination, experiment with different amounts of foam in each type of tire. Foam inserts will usually improve jumping, but they'll tend to decrease traction if they're used in firm tires.

Nipping the knobs off certain tires has also become the norm. RCPS offers scissors that make this a breeze. It's also a great way to get more runs out of a worn set of tires. Use a shorter-knob tire for harder track conditions. If you're in doubt as to which tires to use, ask the locals what works.

New Associated Parts for the Team Car

• Rear arm mounts and hub carriers

are now adjustable on the Team Car. Associated makes six different parts with which you can make adjustments:

0-degree arm mount—part no. 7364

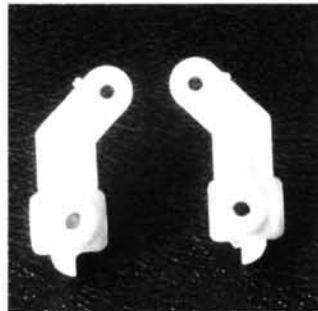
1.5-degree arm mount—part no. 6360

3.0-degree arm mount—part no. 7363

0-degree hub carrier—part no. 7365

1.5-degree hub carrier—part no. 6366

3.0-degree hub carrier—part no. 7358



• New, RC10 in-line aluminum axles

—part no. 6220

• New, RC10 in-line steering blocks

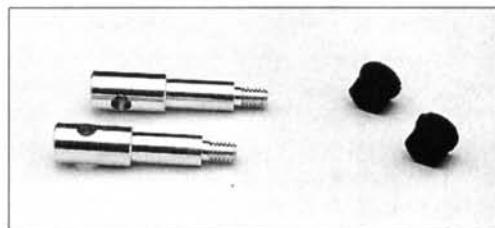
—part no. 6221

• Teflon shock pistons

—part no. 6465

• Improved shock seals (for four shocks)

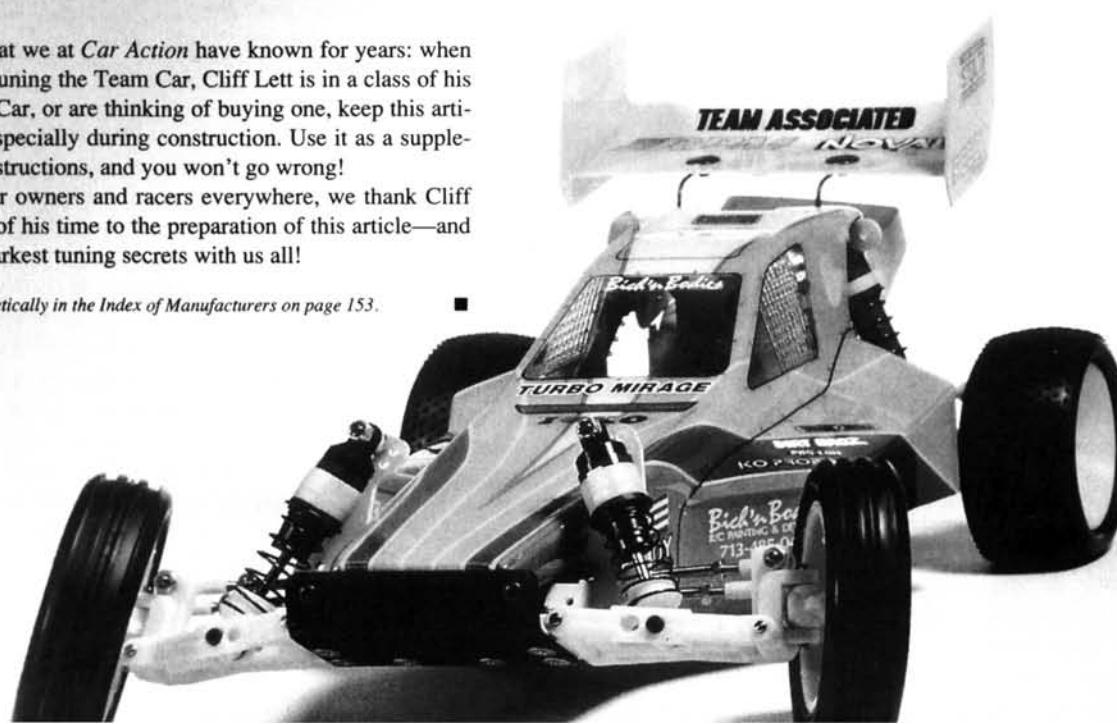
—part no. 6440



Now everyone knows what we at *Car Action* have known for years: when it comes to building and tuning the Team Car, Cliff Lett is in a class of his own. If you own a Team Car, or are thinking of buying one, keep this article handy at all times—especially during construction. Use it as a supplement to the Associated instructions, and you won't go wrong!

On behalf of Team Car owners and racers everywhere, we thank Cliff for devoting many hours of his time to the preparation of this article—and for sharing his deepest, darkest tuning secrets with us all!

*Addresses are listed alphabetically in the Index of Manufacturers on page 153.



NITRO NEWS



WHEN IT COMES to .12 engines, the O.S.* CZ-R has been the industry standard for several years. Some after-market parts have been designed to improve its durability and cooling capabilities, but the CZ design has remained basically the same over the years...until now. The release of the new CZ-Z has taken the .12 engine to the next level. Let's take a look inside this engine to see what was done to increase the CZ's power.

At first glance, the CZ-Z looks identical to the CZ-R, with the addition of a heat-sink head. The engine case is the same externally, but it has some different machine work inside. A stronger connecting rod was added to the engine to increase durability. The bottom end of the rod is considerably thicker, so a slight groove was machined into the bottom of the case for clearance.

A new piston and sleeve were also designed for the CZ-Z. Although it looks as if the CZ-R's and the CZ-Z's sleeves are identical, there are a few differences. The ports are smaller on the CZ-Z, and they've been designed to produce more power—especially low-end power. The case has also been machined to

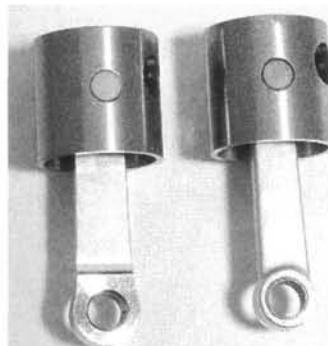
WHAT'S Z DIFFERENCE?

by JOHN HUBER

match the porting in the sleeve.

The timing of the crankshaft was also altered to complement the porting changes to the sleeve. The CZ-Z weighs about $\frac{1}{3}$ ounce more than the CZ-R (because of the heat-sink head), but it also has 30 percent more power! The CZ-Z is rated at .56b.hp at 29,000rpm, whereas the CZ-R is rated at .43b.hp at 28,000rpm.

Like the CZ-R, the CZ-Z is backed by O.S.'s limited two-year



The CZ-Z's connecting rod (left) is considerably beefier than the CZ-R version (right). The new rod should be able to handle the additional 30 percent of power without any problem.

warranty. The CZ-Z's list price is \$219.99, but you should be able to get it for around \$130.

CZ-R UPGRADES

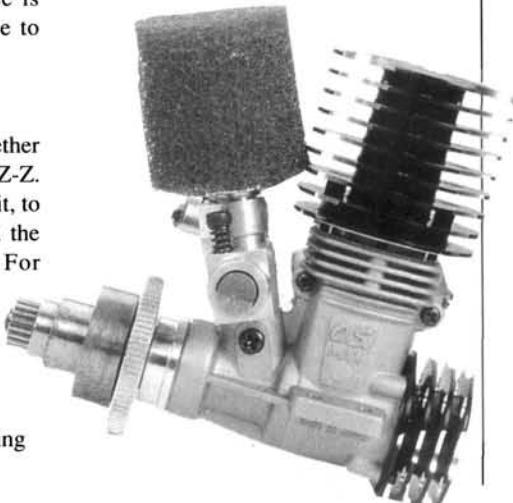
Some people have asked me whether you can convert a CZ-R to a CZ-Z. Although most of the parts will fit, to get the benefits of the CZ-Z, all the parts must be used together. For example, the CZ-Z piston and sleeve will fit the CZ-R, but unless you have the CZ-Z case, the porting won't match up with the case. The CZ-Z's heavy-duty connecting



Porting on the CZ-Z sleeve (right) is much different from that on the CZ-R sleeve (left). Porting changes on the sleeve and crankshaft have boosted the CZ-Z's output to 0.56b.hp.

rod won't work without the CZ-Z case either. The crankshaft will fit in either model, but I'm not sure how well it will work with the older piston and sleeve. So, to convert it correctly, you'd need a piston and sleeve, a crankcase, a connecting rod and a crankshaft. Add the prices of all these, and I think the total would be more than (or close to) the price of a new engine.

If you want to improve your CZ-R, there are several things you can do. If you still have the stock engine head, consider one of the after-market heads made by DuraTrax* or OFNA*. If you increase the area of the cooling surface, your engine will run cooler.



Nitro Query of the Month



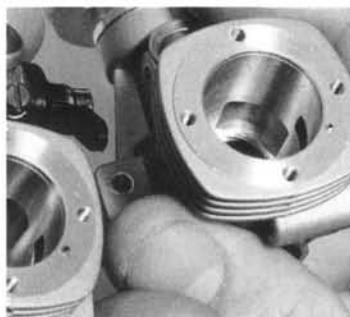
I own a stock MRC Thunder King truck, and I'd like to convert it to gas. I'm aware that there's a conversion kit for this, but I can't get a hold of one, and I also have a low budget. Can you give me a list of parts or conversion-kit and engine accessories? And does anyone make a Chevy Suburban truck body that would fit the Thunder King? Thanks a million, and keep up the great work!

CRAIG MOOERS
E. Northport, NY

Craig, if you want to convert your truck to gas, you should first contact MRC at (908) 248-0400.

They're making gas versions of their trucks, and they might sell a conversion kit, as well. If not, they'll surely sell you the parts you need. You might also call A-Main Racing's Kunio Dudgeon at (913) 383-9481. He has converted a Thunder King to gas, using Kyosho parts, and it works very well.

can drop one right into your engine. If your engine is old, make sure that the new connecting rod fits the crankpin. There should be only a little bit of play where the two parts meet. If the gap is too large, you'll ruin your new connecting rod in no time.



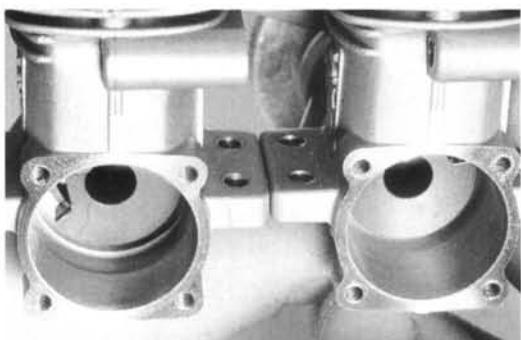
To match the porting of the new sleeve, the case was also reworked. These changes might be slight, but they add up to serious horsepower.

Another way to improve your engine's power is to remove its pull-starter (if it has one). Why? A pull-starter unit incorporates a one-way bearing that's attached to the crankshaft, and the bearing slightly robs the engine of power. Also, by removing the pull-starter, you'll reduce the engine's overall weight and the number of moving parts.

If you remove the pull-starter, you'll need a back-plate to put in its place. You can get one from O.S., or you can get an after-market heat-sink version from DuraTrax, which I recommend. If you go this route, you'll also have to remove the small stud on the end of the crank-shaft pin using a Dremel tool.

The choice is up to you. If you want to get better performance out of your CZ-R, check out these options. If it's time for a new engine, go for the CZ-Z. Don't bother trying to convert.

*Addresses are listed alphabetically in the Index of Manufacturers on page 153. ■



A groove was machined into the CZ-Z case to provide clearance for the beefed-up rod (left).

The cooler your engine runs, the longer it will last, and the leaner you can adjust the mixture.

The second thing you should do is replace the stock connecting rod with one made by RPM* or DuraTrax. These rods are much beefier than the stock rods, and you

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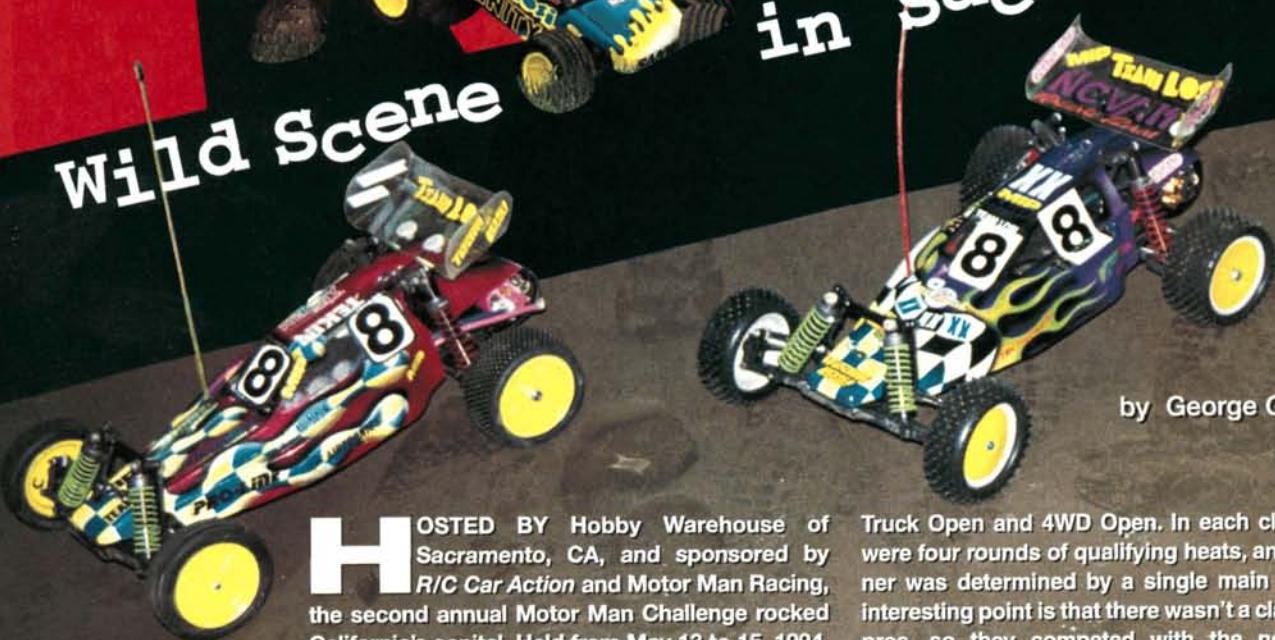
Motor MAN

classic



Wild Scene

in Sacramento!



by George Gonzalez

HOSTED BY Hobby Warehouse of Sacramento, CA, and sponsored by R/C Car Action and Motor Man Racing, the second annual Motor Man Challenge rocked California's capital. Held from May 13 to 15, 1994, the race gave more than 200 racers the rare opportunity to race toe-to-toe with the pros.

THE EVENTS

There were five racing classes at the Motor Man Challenge: 2WD Stock, 2WD Open, Truck Stock,

Truck Open and 4WD Open. In each class, there were four rounds of qualifying heats, and the winner was determined by a single main event. An interesting point is that there wasn't a class for the pros, so they competed with the novice and expert-class drivers. This gave the novice and expert racers a chance to compete with some of the world's best drivers. If that wasn't enticing enough, the event was absolutely free to all the un-sponsored drivers. No wonder more than 200 racers showed up!



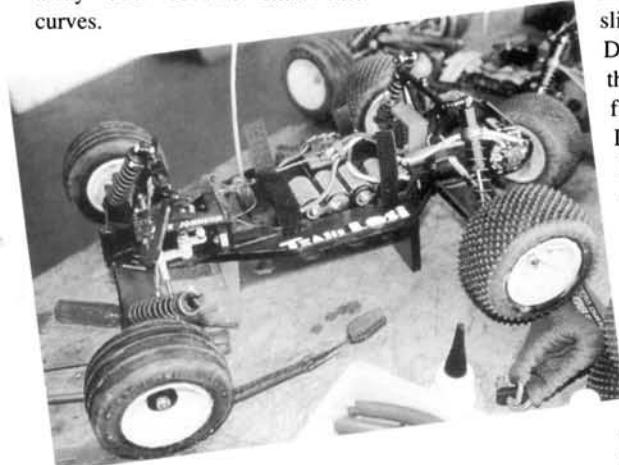
THE FACILITY

Hobby Warehouse's giant facility offers a fully stocked pro shop and a tight, yet fast, indoor off-road track that resembles an MTGP track. The hard-packed surface was difficult to master and called for some pretty unusual tire-tread combinations. The track has two giant banked corners, two huge tabletop jumps (one with a ravine in the middle), a high-speed sweeper, a long straightaway and several snake-like curves.

STOCK A-MAIN ACTION

• 2WD Stock. After a rocky start, TQ Jack Ingberg led the way, while Tom Leman and Sohrab Tavakoli put on the pressure. Midway through the race, a chain of mishaps put Tavakoli in the lead, and Ingberg dropped into second. Leman slipped into seventh, and David Haslip sneaked ahead to third. Tavakoli crossed the line first with a 14/4:00.75, and Ingberg finished second with a 14/4:04.37. In third was Haslip with a 14/4:06.69.

• Truck Stock. TQ Gary De Leon took the lead and said, "See ya!" as he led the way, nearly half the track's distance ahead of the rest of the pack. Bob Sopeland followed in a comfortable second, while Brian Flemmer and Bob Russell battled for third. At around the halfway point,

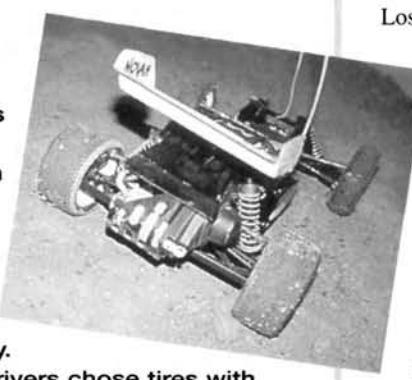


Here's a sneak peek at Jack Johnson's prototype Double-XT.

TRACTION TALK

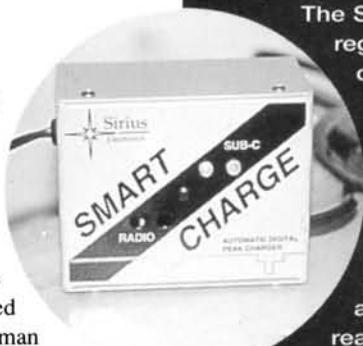
At Hobby Warehouse's facility, the track's surface was hard-packed with a soft, mud-like base—extremely challenging. In the 2WD Open Class, the tires of choice were Kyosho Fuzzie fronts and Pro-Line Flat Fuzzie rears. In Truck Open, Losi ribbed fronts and Pro-Line Fuzzie rears were the most popular tires, and Losi IFMAR mini-pins were also used by many.

Because of the track's soft base, most drivers chose tires with the original XT compound over Losi Golds and tires made of the softer Pro-Line XTR compound.



SIRIUS CHARGERS FOR SERIOUS RACERS

Don McGlaulin, president of Sirius Electronics*, was present at the Challenge and provided a battery-charging station for the contestants. Sirius Electronics has just introduced an innovative line of digital peak-chargers for sub-C batteries—the Smart Chargers. These compact chargers are idiot-proof: there aren't any buttons to press or dials to adjust; just plug in the battery.



The Smart Charge regulates the charge current at the optimal 5.3 amps, regardless of the battery voltage or the number of cells. In minutes, you'll have a fully peaked, rejuvenated battery pack, ready to race. The chargers also have a built-in cooling fan, which is an option on most chargers. Many drivers took advantage of McGlaulin's service and were pleased with the results.

Russell snaked his way into the third spot and stayed there for the rest of the race. De Leon finished first with a 14/4:09.55; Sopeland, second with a 14/4:15.62; and Russell, third with a 13/4:04.65.

OPEN A-MAIN ACTION

• 2WD Open. From the sound of the buzzer, TQ Matt Francis (Team Associated) shot ahead for the lead. Close behind were Team Associated's Greg Hodapp and Trinity/Team Losi's Brian Kinwald. At the halfway point, there was a battle for second place as Francis's lead grew. Kinwald put so much pressure on Hodapp that it was only a matter of seconds before he passed Hodapp and started making his way to the leader. With less than 30 seconds left, Kinwald was knocking on Francis's back door. The spectators were ecstatic as the two went toe-to-toe. With 20 seconds left, tragedy struck Francis: he came off the first tabletop a little wildly and rolled his car in the turn. Kinwald capitalized on this misfortune and took the lead, finishing first with a 15/4:01.98. Francis took second with

MOTOR MAN CLASSIC WINNERS



2WD STOCK

Fin.	Qual.	Name	Chassis	Motor	ESC	Radio	Batteries
1	4	Sohrab Tavakoli	Losi	H	Novak	Airtronics	Trinity
2	1	Jack Ingberg	Associated RC10	A	Novak	Airtronics	Double Strike
3	8	David Haslip	Losi XX	N	Novak	JR Propo	Orion
4	6	David Goss	Associated RC10	D	Novak	Airtronics	Reedy
5	3	Rob Moots	Losi XX	O	Tekin	Airtronics	Reedy
6	2	Tom Leman	Associated RC10	U	Novak	Airtronics	Reedy
7	9	Joel Bunce	Losi	T	Tekin	Airtronics	Motor Man
8	10	Brian Kinney	Losi XX	—	Novak	Airtronics	Motor Man
9	7	Sam Helwer	Associated RC10	—	Novak	Airtronics	Reedy
10	5	Jason Pettinato	Associated RC10	—	Novak	Airtronics	Reedy



4WD

Fin.	Qual.	Name	Chassis	Motor	ESC	Radio	Batteries
1	1	Aaron Biner	Yokomo YZ10	Reedy	Novak	Airtronics	Reedy SCRC
2	2	Jimmy Jacobson	Yokomo	Reedy Sonic	Tekin	Airtronics	Reedy
3	3	Jeff Wittman	Schumacher	Matrix	Tekin	Airtronics	Double Strike
4	8	Jeff Lewis	Yokomo	Peak Performance	Tekin	Airtronics	Orion
5	5	Skip Hart	Schumacher Cat 2000	Trinity	Novak	Airtronics	Reedy
6	6	Bruce Beaver	Schumacher Cat 2000	Reedy	Tekin	Airtronics	ESP
7	4	Shawn Nibbelink	Schumacher	Reedy	Tekin	Airtronics	Reedy
8	9	James Arluck	Yokomo	Reedy	Novak	Airtronics	Double Strike
9	10	Rick Post	Boss Cat	Reedy	Tekin	Airtronics	Reedy Ultra
10	7	Rick Clement	Dukemo	Reedy	Novak	Airtronics	Reedy



TRUCK STOCK

Fin.	Qual.	Name	Chassis	Motor	ESC	Radio	Batteries
1	1	Gary De Leon	Losi LXT	H	Tekin	Futaba	Motor Man
2	4	Bob Sopeland	Losi	A	Tekin	Airtronics	Reedy
3	2	Bob Russell	Associated 10T	N	Tekin	Airtronics	Double Strike
4	5	Matt Tayo	Losi LXT	D	Tekin	Futaba	Max Cell
5	6	Brian Flemmer	Losi	O	Novak	Futaba	Trinity
6	7	Paul Edwards	Losi	U	Novak	Airtronics	Reedy Ultra
7	9	Phil Looper	RC10T	T	Novak	Futaba	Motor Man
8	10	Mitch Haynes	Losi LXT	—	Tekin	Airtronics	Trinity
9	3	Derrick Boyden	Losi LXT	—	Tekin	Futaba	Motor Man
10	8	Gene B. Dumpit Jr.	Losi	—	Novak	Futaba	Motor Man



TRUCK OPEN

Fin.	Qual.	Name	Chassis	Motor	ESC	Radio	Batteries
1	1	Brian Kinwald	Losi LXT	Trinity	Novak	Airtronics	Trinity
2	3	Matt Francis	RC10T	Reedy	Novak	Airtronics	Reedy
3	2	Mark Francis	RC10	Reedy	Novak	Airtronics	Reedy
4	4	Greg Hodapp	Associated RC10T	Reedy Sonic M	Novak	Airtronics	Reedy
5	5	Jason Moberly	Associated RC10T	Sonic E	Tekin	Caliber	Motor Man
6	8	Rick Clement	RC10T	Extreme Motorsports	Novak	Airtronics	Motor Man
7	9	Derrick Boyden	Losi LXT	Trinity Diamond	Tekin	Futaba	Motor Man
8	10	Chris Barnes	Stock	Reedy	Novak	Airtronics	Double Strike
9	7	Dan Lodermeier	Associated	Reedy	Novak	Airtronics	Max Cell
10	6	John Scott	Losi	Reedy	Tekin	Airtronics	Matrix



2WD OPEN

Fin.	Qual.	Name	Chassis	Motor	ESC	Radio	Batteries
1	3	Brian Kinwald	Losi XX	Trinity	Novak	Airtronics	Trinity
2	1	Matt Francis	Associated RC10	Reedy	Novak	Airtronics	Reedy
3	2	Greg Hodapp	Associated RC10	Reedy	Novak	Airtronics	Reedy
4	5	Mark Francis	Associated RC10	Reedy	Novak	Airtronics	World Class
5	4	Crispin Aribas	Associated RC10	Extreme Motorsports	Novak	Airtronics	Reedy
6	10	Brad Nibbelink	Losi XX	Reedy	Tekin	Airtronics	Reedy
7	6	Jimmy Jacobson	Associated RC10	Reedy	Tekin	Airtronics	Reedy
8	8	Sohrab Tavakoli	Losi	Trinity	Novak	Airtronics	Trinity
9	7	Jack Ingberg	Associated RC10	Reedy	Novak	Airtronics	Double Strike
10	9	Dustin Tobin	Losi XX	Reedy	Tekin	Airtronics	Motor Man

a 15/4:02.33, and Hodapp took third with a 15/4:03.93. Talk about close!

• **Truck Open.** Kinwald took the hole-shot, with Matt Francis and Mark Francis hot on his tail. Their positions never changed, but the three trucks rubbed fenders the whole way. Kinwald finished first with a 15/4:00.20, Matt Francis took second with a 15/4:01.57, and Associated dri-

ver Mark Francis rounded up third with a 15/4:02.33.

• **4WD Open.** TQ Aaron Biner took the lead and never looked back. Following were Jimmy Jacobson in second and Jeff Wittman in third. Their positions didn't change for the duration of the race, but the distance between the racers grew. At the sound of the buzzer, Biner squeezed in an

almost unheard of 16th lap to win the race, and he posted the event's fastest time: 16/4:14.89. Jacobson finished second with a 15/4:02.11, and Wittman took third with a 15/4:05.33.

MEETING THE CHALLENGE

The second annual Motor Man Challenge was a great success, thanks to the staff at

Body	Tires
Jammin'	Losi
RCPS	Kyosho/Pro-Line
Losi	Losi
RCPS	Kyosho/Pro-Line
Losi	Kyosho/Losi
RCPS	Kyosho/Pro-Line
Losi	Kyosho/Pro-Line
Losi XX	Pro-Line/Losi
Mirage SS	Kyosho/Losi
SS Mirage	Kyosho/Pro-Line

Body	Tires
Yokomo YZ10	Kyosho
Yokomo YZ10	Kyosho
Schumacher	Pro-Line
Yokomo	Kyosho
Schumacher Cat 2000	Kyosho/Pro-Line
Schumacher Cat 2000	Kyosho
—	Kyosho
Yokomo	Kyosho
Stock	Pro-Line
Yokomo	Pro-Line

Body	Tires
A&L Slam-It	Losi
Andy's	Losi
Dahms Slammer	Pro-Line
Losi	Losi
Losi	Pro-Line/Losi
Dahms	Losi
RC10T	Pro-Line/Pro-Line
Losi LXT	Losi/Pro-Line
Losi	Losi/Pro-Line
Losi LXT	Losi

Body	Tires
Losi	Losi
Stock	Pro-Line
Stock	Pro-Line/Pro-Line
RCPS Mirage SS	Pro-Line/Pro-Line
RC10T	Losi
RC10T	Losi
Losi	Losi/Pro-Line
Stock	Losi/Pro-Line
Associated	Pro-Line
Losi	Pro-Line/Losi

Body	Tires
Jammin'	Kyosho/Losi
RCPS	Kyosho/Pro-Line
RCPS Mirage SS	Kyosho/Pro-Line
RCPS	Kyosho/Pro-Line
RCPS	Kyosho/Pro-Line
Losi XX	Kyosho/Losi
Mirage	Kyosho/Pro-Line
Jammin'	Losi
RCPS	Kyosho/Pro-Line
Losi XX	Kyosho/Pro-Line

Hobby Warehouse of Sacramento—Roger Hubbard, Ann Hubbard, Gary De Leon, Julz Lorens, Garet Hubbard, Ed Hernandez, Chris Bain, Lori Crozier—and all the racers who competed. I can't wait until the next Motor Man Challenge. I know I'll be there with my camera! ■

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Filter Facts

Dirt is the biggest enemy of any type of engine. Even the smallest bit will wear the piston and sleeve as well as the bearings and the connecting rod.

When they're maintained properly, a good air filter and a good fuel filter will keep nearly all contaminants out of your engine. Fuel filters are easy to install: just cut the fuel supply line and connect the filter. Some filters are designed to work in one direction only, so take care when installing them. In-line filters, which are inexpensive and easy to maintain, are available from Du-Bro*, Sullivan* and other companies. You can maintain the filter simply by keeping it clean: a shot of motor spray in the reverse direction will remove all deposits. Clean it after every half gallon of fuel; it's worth the trouble. I once had a clogged filter that caused my engine to run lean. No matter how many turns I opened the needle, it still ran lean. After a quick fuel-filter cleaning, it was back to normal.

Air filters are a little trickier to deal with. Many engines come with a paper-element filter, which works well but can quickly become clogged in very dusty conditions. To help a paper element cope with the dirt, you can add a foam cover to it.

This helps a lot, but be careful if you put oil on the foam. Oiling it will help it to catch the dust, but if the oil soaks into the paper element, it will clog it. Once a paper filter becomes clogged or dirty, it's ruined; it can't be cleaned.

Many engines come only with foam filters, which must be oiled to work properly. The best oil I've found for foam filters is K&N* Foam Filter Oil. It's thick and sticky, so it stays where you put it, and it grabs dirt well. You might have to ask an auto-parts store to order it for you.

Foam filters are great because they can be cleaned and reused. To clean a foam filter, soak it in dishwashing soap and water. Rinse it from the inside out, and continue to soak it until all the dirt has gone. Let the filter dry overnight before you use it again.

Make sure that the filter fits tightly and that there's no way it could fall off while the truck is running. Use tie-wraps or a hose clamp to keep it in place.



There are two types of air filter: paper (left) and foam (right). Both work well, but foam filters are easier to clean.



If you oil a foam air filter, you'll help it to keep small particles out of your engine's carb.

If you're starting an engine for the first time, be careful not to damage it by over-revving it or running it too lean. Start the engine and place the truck on the ground. Set the needle valve at about three turns out by turning it all the way in until it stops, then turning it out three complete turns. Give the throttle a short burst and see whether the truck moves. You want the engine to be extremely rich, so that it has very little power. (I like it to be so rich that

Box It Up!

When you go out to run, what do you need to take along? I made up a small, easy-to-carry kit to take to the track. I carry the gear in a cheap plastic tote box from a hardware store. It holds all the stuff I need for a few hours of running: an electric starter, a 12V battery, a Ni-starter or a similar glow battery, spare plugs, a plug wrench, after-run oil, a fuel bottle and various tools that I might need to make repairs.

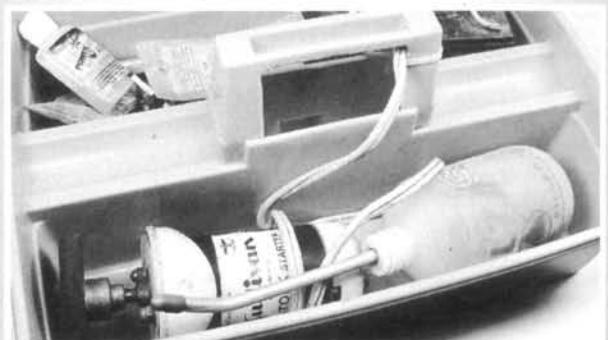
If you have a truck with a pull-start engine, you won't need the electric starter or the 12V battery. Your truck might also come with a battery holder and a clip to ignite your glow plug. If so, you won't need a rechargeable glow driver.

Spare plugs are a must. If your engine stops running when you disconnect the glow driver, try a new plug. The after-run oil is to protect your investment. It coats all the internal engine parts with a protective film, and it drives moisture away. After a day at the track, put a few drops into the carb and the glow-plug hole, and turn the engine over a few times to spread it around.

With all these goodies in one easy-to-carry tote box, it's easy to run a gas truck anywhere!



Liquid thread-lock is a must for any pit box. Use it on all metal-to-metal connections to prevent the screws from vibrating loose.



A small plastic tote box can hold everything you need to get your gas engine running.

*Here are the addresses of the companies mentioned in this article:
Du-Bro Products, 480 Bonner Rd., Wauconda, IL 60084.
Sullivan Products; distributed by Swenson Specialties, P.O. Box 663, 2895 Estates Ave., Pinole, CA 94564.
K&N Engineering Inc., P.O. Box 1329, Riverside, CA 92502.

Breaking In a New Engine

my truck barely goes 10 mph.) Run the truck in an open parking lot where you can keep it moving. Vary the throttle, but don't rev too much.

After the first tank, check to see how hot the engine is. Just use the old spit test: put a drop of saliva on the cylinder head and see how it reacts. If the engine is very hot, the saliva will dance and crackle and evaporate

quickly. When you break in an engine, you want it to stay as cool as possible; ideally, your saliva shouldn't move much and should evaporate slowly.

Run through four more tanks in the same way. To pick up more speed, you can turn the needle in a little each time to lean the mixture, but don't forget to check the engine temperature.



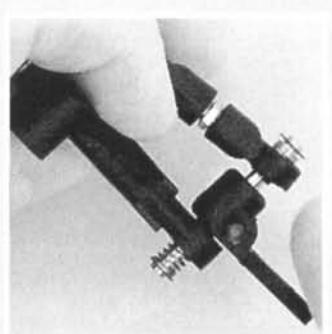
R / C D O C T O R

A STICKY SITUATION

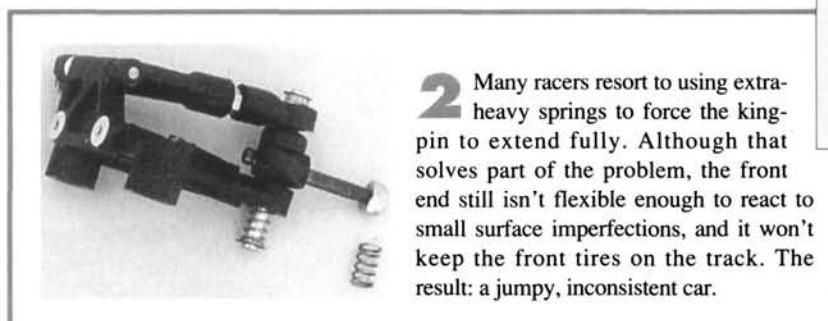
by DOUG MERTES

IT ALL STARTED when the guy pitting next to me came back from his practice session with a disgusted look on his face. Putting his car back on its stand, he began mumbling to himself about the handling of his normally stable Associated* 10LSS. "It's possessed," he said. "Last week, everything was just fine. Now, it seems like a different car on every turn of the oval. One lap, it wants to go too high, and the next lap, it turns in so easily that I hit the inside wall!" It sounded as if he was about to pack up and go home. He had even tried resetting the tweak, installing new tires front and rear and even putting on a different body. Nothing made the car settle down.

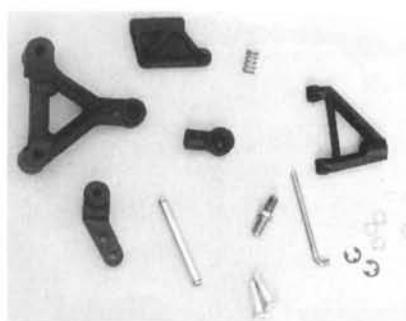
I thought that I knew just what the problem was, because I had precisely the same experience just a few weeks before. A "sticky" front suspension on my own 10LSS with the Dynamic Strut front end had caused wildly unpredictable handling from lap to lap. I shared my solution with my fellow racer, and now I'll do the same with you. (I hate to hear people talking to themselves in the pit area!)



1 The steering knuckle on the Dynamic Strut front end captures the kingpin, so the pin has to slide freely up and down through the plastic ball inserts in the upper and lower arms. This is frequently the major cause of front-end bind. The front end actually "collapses" a little and never returns to full extension.



2 Many racers resort to using extra-heavy springs to force the kingpin to extend fully. Although that solves part of the problem, the front end still isn't flexible enough to react to small surface imperfections, and it won't keep the front tires on the track. The result: a jumpy, inconsistent car.



3 Start by disassembling the front end, and thoroughly clean all the parts with a good-quality motor spray.



4 Now is a good time to determine how straight the kingpins and front axles are. Roll them across a flat surface, such as the top of your workbench. If necessary, replace the axles with a set that secures the wheels with a nut, like these from C&M/Cobra*.

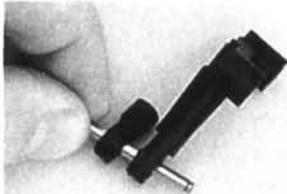


5 Polish the kingpins. Put them in a drill, and while it's turning, use a soft cotton shop towel and some Happich Simichrome or other metal polish to remove all surface imperfections.

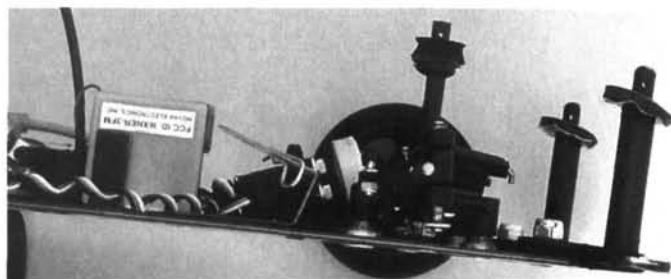
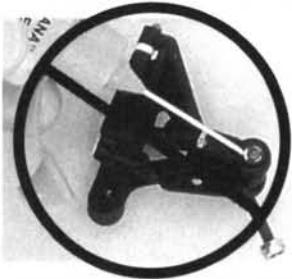


6 At this point, you either try to fix the plastic ball inserts or replace them. To fix them, try running an $\frac{1}{8}$ -inch drill bit through the upper and lower arm inserts, all the way up into the uncut portion of the shaft, and let the inserts warm up. You don't want to remove any material; just ensure that the inserts are sized properly.

7 While the inserts are still warm, slide the kingpin back in and rotate it for a few minutes until the inserts cool down. Of course, you can also simply replace the balls with new ones for a couple of bucks. Make sure you follow the instructions exactly when installing the balls, or you will damage them! Never use pliers!



8 Put everything back together now, but don't use any lubricant on the parts. The plastic inserts should move smoothly over the kingpins without lube. Your steering knuckles should now slide up and down and rotate through full steering lock with very little resistance.



10 Have the springs collapsed? When you reassemble the front end, there might be some vertical wheel slop that's caused by "short" front springs. You can replace them, but placing one or two no. 4 washers beneath the E-clip under each spring will also work.



11 You might also find that there's too much play in the front end where the long pins are inserted into the camber blocks. If so, one or two *very thin* nylon washers will take up the slack and make your caster adjustments precise once more!

*Addresses are listed alphabetically in the Index of Manufacturers on page 153. ■

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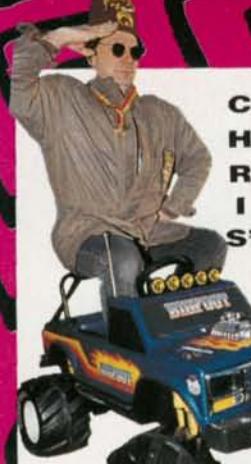


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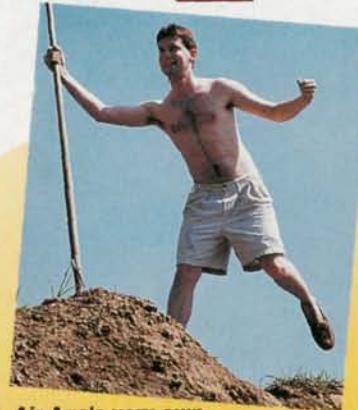
CHRIS'

BACK LOT

This is my page—MINE!



No, that's not the Green Hornet and his latest prey. That's Trinity President Ernie Provetti trying to light a fire with a French firewoman at the 1/2-scale Worlds in Laigneville, France. That really is a French fire helmet.



Air Age's very own gardening slug: Editor John "Sluggie" Howell. Please be careful with that salt shaker!



Yours truly runs MRC's new MT10M monster truck off the loading dock—a 10-foot high drop! It survived many jumps with no damage at all.

What's This?

In case you're thinking, "What's Chianelli doing now?" allow me to elaborate: WHATEVER THE HELL I FEEL LIKE DOING! You see, this is my page—MINE!! Which simply means it's your page. I want all of you, except for politically cor-

rect yuppie sheep who are too busy anyway saying things like, "Isn't that last year's BMW?," or "Grow up Chianelli," to write to me about something that's bothering you or making you a happy little pilot!

Write about anything, even if it's a complaint or an opinion on how social anthropology explains R/C cars and trucks in the modern world. One rule though: all BRIEF correspondence must be accompanied by a photo; the more unacceptable (in all possible ways), the better. Lousy Polaroids are AOK bubba! I love cruddy photos! From the sample photos I've given here in my little introduction to this new page, I'm sure you can surmise that anything goes. All submittals will be considered, be they from readers, racers, manufacturers or, of course, the Apollo Mission.

Send in pictures of your girlfriends, your R/C projects, action shots, girlfriends, blown speed controllers, your dog, your cat, your grandparents, your home-made track and of course, if you like, a snapshot of your girlfriend would be nice.

Serious Section

Nothing this month. Maybe next!

Quotes of the month: "Don't think; feel."
—Bruce Lee

"Always blame the turn marshal."
—CC

It's Not your Dad's Blackfoot ANY More

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KEEP in Mind I'm PLAYIN
WAIT Till I GET SERIOS

Gary
Holyoke, MA

Above: Gary of Holyoke, MA, eruditely describing his Blackfoot (right) better than I ever could.

Another highlight from the 1/2-scale Worlds: a very pretty pit-crew member from the Czechoslovakian team.



The opinions expressed on this page do not necessarily represent the opinions of the entire Car Action staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, 251 Danbury Rd., Wilton, CT 06897.



A splendiferous display of the summer racing scene.